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HELMINTHOLOGICAL ABSTRACTS

incorporating

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HELMINTHOLOGICAL ABSTRACTS *incorporating* BIBLIOGRAPHY OF HELMINTHOLOGY

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HELMINTHOLOGICAL ABSTRACTS

INCORPORATING BIBLIOGRAPHY OF HELMINTHOLOGY

FOR THE YEAR 1957

Vol. 26, Part 5/6

488—Acta Medica Philippina.

- a. YOGORE, Jr., M. G., 1957.—“Studies on paragonimiasis: III. The effect of ligation of the left pulmonary artery on the localization and growth of *Paragonimus* in the lungs of experimentally infected cats.” Year 1956-57, **13** (1/4), 157-175.
- b. GUEVARA, R., VALDEZ, E. V. & ROMAN, L. R., 1957.—“Piperazine hexahydrate on ascarigram.” Year 1956-57, **13** (1/4), 375-394.

(488a) Yogore found that when the left pulmonary artery was ligatured in uninfected cats fed *Paragonimus* metacercariae, fewer worms established themselves in the left than the right lung, and that those worms which did localize in the left lung did not grow so well as those in the right lung. He concludes that integrity of the pulmonary circulation is necessary for normal localization and growth of *Paragonimus* in the lungs.

J.M.W.

(488b) Kymograph readings were made of the movements *in vitro* of 34 *Ascaris lumbricoides*. The worms were obtained at autopsy of bodies in the city morgue, Manila. The ascarids were maintained in Bunge's solution for some days before use and the more vigorous specimens were selected for experimentation. The experimental medium consisted of a range of concentrations of piperazine hexahydrate in Bunge's solution maintained at 37°C. Narcosis of the worms was produced by drug concentrations of 1:25 to 1:150. No stimulation was observed. Exposed worms recovered wholly or partially when replaced in drug-free medium, but recovery was erratic and impermanent.

O.D.S.

489—Acta Microbiologica Hellenica.

- a. MAZIDIS, S. P., 1957.—[A human case of dicrocoeliasis.] **2** (1), 58-66. [In Greek: French summary pp. 65-66.]

490—Acta Parasitologica Polonica.

- a. FURMAGA, S., 1957.—“Helmintofauna ptaków drapieżnych (*Accipitres* et *Striges*) okolic Lublina.” **5** (13/21), 215-297. [English summary pp. 293-297.]
- b. PROST, M., 1957.—“Monogenoidea skrzeli ryb Wisły.” **5** (13/21), 299-395. [English summary pp. 390-395.]
- c. POJMAŃSKA, T., 1957.—“Wpływ zageśzczenia hodowli na rozwój jaj *Triaenophorus lucii* (Müll.).” **5** (13/21), 397-406. [English summary pp. 405-406.]
- d. REMBOWSKA-WACHOWSKA, M., 1957.—“Badania nad rolą pasożytów w przewlekłych schorzeniach jelitowych u dzieci w wieku 0-4 lat.” **5** (13/21), 407-427. [English summary pp. 425-427.]
- e. IWANCUK, I. & DOŻAŃSKA, W., 1957.—“Wpływ chlorowania na przeżywalność jaj *Ascaris suis* w ściekach miejskich.” **5** (13/21), 429-448. [English summary pp. 447-448.]
- f. RYBICKA, K., 1957.—“Three species of the genus *Diorchis* Clerc, 1903 occurring in European coot (*Fulica atra* L.).” **5** (13/21), 449-479. [Polish summary pp. 478-479.]
- g. KOZAR, Z. & WARDA, L., 1957.—“Poszukiwanie rezerwuaru włośnicy wśród drobnych ssaków Puszczy Białowieskiej.” **5** (13/21), 481-485. [English summary p. 485.]
- h. SOŁTYS, A., 1957.—“Badania nad robakami pasożytniczymi drobnych gryzoni Parku Narodowego w Białowieży.” **5** (13/21), 487-504. [English summary pp. 502-504.]

(490a) Of the 618 predatory birds (belonging to 26 species of *Accipitres* and *Striges*) examined in the course of six years in the Lublin area, 307 (49.7%) were infected with 30 species of helminths. The latter are described and figured and include 21 new host records,

* Titles so marked throughout this number have not been seen in the original.

27 [22 in a table] new records for Poland and three [four in a table] also new for Europe. A study of the infection rates throughout the year shows a maximum in June (62.9%) followed by a quick fall and a second rise in the autumn. There was no basic difference in the composition and frequency of the helminth fauna between years in which small field rodents were scarce and those in which they were abundant, indicating that not the field rodents but probably insects and insectivorous rodents are the principal intermediaries for the helminths of predatory birds. The results are set out in 11 tables. G.I.P.

(490b) In this study of the Monogeneoidea of fish in Poland, Prost has examined eleven species of fish (mainly percid) at five points along the Vistula. The 25 trematodes she describes are typical for central and eastern Europe. She discusses their specificity, and the occurrence of multiple infections and seasonal variation, tabulating her results. *Brachyspirura epizootica* was found hyperparasitic on *Dactylogyrus amphibothrium* from *Acerina cernua*, the gills of which were heavily infested with the protozoan. The fauna was poorest numerically and in composition at the source of the river and increased progressively to a maximum near Toruń but fell in parts of the river where there was a strong current and high pollution from sewers. G.I.P.

(490c) The effect of a crowded egg culture on the development of *Trienophorus lucii* eggs is to prolong embryonic development and to delay and partly prevent hatching. At 60,000 eggs per c.c. of water the rate of development was normal or nearly so and 80% of the larvae hatched, but at 88,000 eggs per c.c. only 67% hatched, at 120,000, 58% and at 235,000, 30%. The hampering of development was probably not due directly to congestion but to insufficient oxygen. G.I.P.

(490d) The causes of chronic diarrhoea in children aged up to four years and examined in Warsaw were most frequently the bacterium *Shigella*, *Enterobius vermicularis* and various protozoans. *E. vermicularis* was present in 16.1% of children with diarrhoea and in 7.6% of healthy children; *Ascaris lumbricoides* was rarer. The simultaneous occurrence of various parasites and of bacteria and the effect of a combined treatment on chronic diarrhoea are discussed and the numerical data tabulated. G.I.P.

(490e) Laboratory experiments show that active chlorine at doses normally used for the disinfection of sewage is not only ineffective in killing *Ascaris suum* eggs but accelerates their development. Of the various chlorinating agents tested, only chlorine water, at pH below two and for a proper time of contact, acts adversely destroying 45% and 100% of *Ascaris* eggs at concentrations of 400 mg. and 1,000 to 3,000 mg. of chlorine per litre respectively. Chlorinated calcium [CaCl(OCl)], calcium and sodium hypochlorites and chloramine-T at concentrations of up to 5,000 or 10,000 mg. per litre chlorine had no ovistatic or ovicidal effect. G.I.P.

(490f) A high proportion of the *Fulica atra* and a few of the *Gallinula chloropus* examined on Lake Drużno in Poland were infected with *Diorchis ransomi*, *D. inflata* and *D. brevis* n.sp. [a footnote states that this species was originally named *D. brevicirrosa* by the author in a preliminary note in *Wiadomości Parazytologiczne*, 1956, 2 (5), but that the original diagnosis was insufficient and the name is therefore a nomen nudum]. *D. brevis* is similar to *D. inflata*, but measures 22 mm. to 70 mm. in length when mature and the cirrus is 0.04 mm. to 0.06 mm. long, with a spherical swelling which is uniformly covered by large spines, while *D. inflata* measures 150 mm. to 200 mm. in length and the cirrus is ten times longer with only the basal part of an elongated swelling covered by spines. The specimens recorded by Joyeux & Baer in 1936 and by Dubinina in 1953 as *D. inflata* may be identical with *D. brevis* but their incomplete descriptions prevent full identification. Attempted infection of all potential ostracod and copepod hosts present in Lake Drużno was successful in *Cypridopsis vidua* with all three *Diorchis* species. A description of the cysticercoids is followed by a discussion on the host specificity of various *Diorchis* species in relation to their independent existence. G.I.P.

(490g) A microscopical examination of 1,759 small Insectivora and Rodentia (17 species) from the Białowieża forests (a centre of trichinellosis) was negative for *Trichinella*. The authors, supporting the view of Sołtys (1952), suggest that the *T. spiralis* larvae reported from these forest mammals in the Białowieża area by Karpiński & Kamińska in 1948 and by Belyaeva in 1954 and 1955 must have been those of some other nematode, probably of *Porrocaecum*. G.I.P.

(490h) The material collected during 1949–50 from 184 *Microtus agrestis* and 285 *M. subterraneus* in the Białowieża National Park consisted of five identified cestode species, the trematodes *Notocotylus noyeri* (a new record for *M. agrestis*) and *Plagiorchis polonicus* n.sp., and some nematodes which are being recorded separately. *P. polonicus*, present in only one *M. agrestis*, differs from *P. muris* in the absence of a pharynx and from this and *P. arvicolae* in having longer and more wrinkled testes. No material of *P. massino*, the fourth species in the sub-genus *Multiglandularis*, was available for differentiation. Although the new species does possess a seminal vesicle it is placed in *Plagiorchis* due to the complete agreement of the other characters, and the diagnosis of the genus is emended to "seminal vesicle present or absent". A complete list of the helminths known for *M. agrestis* and *M. subterraneus* is appended. G.I.P.

491—Acta Physiologica Sinica.

- a. CHU, C. C., LIANG, Y. & TING, K. S., 1957.—[Studies on antibilharzial drugs. XI. Experimental therapy with 32 drugs.] **21** (4), 394–402. [In Chinese: English summary p. 402.]

492—Acta Veterinaria. Budapest.

- a. SPASSKAYA, L. P., 1957.—[Cestodes in birds in the Yakutsk A.S.S.R. II.] **7** (2), 101–127. [In Russian.]
- b. KASSAI, T., 1957.—"Die Synonymie des *Cystocaulus ocreatus*." **7** (2), 157–163.
- c. KASSAI, T., 1957.—"Über die geographische Verbreitung der Protostrongylidose der Schafe." **7** (2), 165–173.
- d. SPASSKAYA, L. P., 1957.—[Cestodes in birds in the Komi A.S.S.R.] **7** (2), 185–207. [In Russian.]
- e. BABOS, S., 1957.—"Beiträge zur Kenntnis der Wurmfauna Ungarns. II. Fadenwürmer der Fledermäuse." **7** (3), 325–327.
- f. EGYED, N. & NEMESÉRI, L., 1957.—"Parenterally administered carbon tetrachloride in treating fasciolosis in sheep." **7** (3), 345–350.
- g. KASSAI, T., 1957.—"Die Differentialdiagnose der Protostrongyliden von Schafen auf Grund pathologisch-anatomischer Veränderungen." **7** (3), 351–360.

(492a) Forty-nine species of birds in Yakutsk A.S.S.R. were examined for cestodes. The 24 cestode species found are listed under hosts; 11 of them have already been recorded for Yakutsk [see *Acta Vet. Budapest*, 1956, **6**, 287–312], while 13 are new for the region although 11 of them occur in other parts of Eurasia. Described and figured are *Anomotaenia reductorhyncha* n.sp. from *Parus cinctus* with a rudimentary unarmed scolex, and one specimen of *Dilepis* sp. from *Perisoreus infaustus*. Spasskaya gives her own descriptions and figures for 14 of the 24 species. G.I.P.

(492b) Kassai has studied the systematics of the genus *Cystocaulus*. He recognizes three species, viz., *C. ocreatus* (Railliet & Henry, 1907), *C. cervi* Boev, 1950, *C. vsevolodovi* Boev, 1946. After a detailed survey of the literature and an account of his own observations, Kassai concludes that *C. nigrescens* (Jerke, 1911) is a synonym of *C. ocreatus*. He appends a full list of the synonymy of *C. ocreatus*. A.E.F.

(492c) Kassai examined, during the period May 1953 to January 1954, the lungs of 262 sheep in Hungary: he found 146 (55.7%) infected with protostrongylids and 92 (35.1%) infected with *Dictyocaulus*. During the period May 1954 to January 1955 he examined 305 sheep lungs infected with protostrongylids and found the following species: *Cystocaulus ocreatus* in 68.2%, *Protostrongylus* spp. in 52.6%, *Muellerius capillaris* in 19.7%, and *Neostongylus linearis* in 10%. Kassai admits that the data available on the distribution of protostrongylids in Hungarian sheep is unreliable because of limited material and unsatisfactory techniques. He suggests methods which should be used for future surveys. A.E.F.

(492d) The 46 cestode species collected from 961 birds in the Komi A.S.S.R. include two new species. *Paricterotaenia turdi* n.sp. from *Turdus musicus* and *T. pilaris* differs from the other species of this genus in having 14 to 16 scolex hooks, 0.054 mm. to 0.058 mm. in length. *Choanotaenia perisorei* n.sp. from *Perisoreus infaustus* is nearest to *C. passerina* but differs in the structure of the sex organs and has only 20 scolex hooks 18 μ to 19 μ in length, while *C. passerina* has 35 hooks 12 μ in length. There are two types within *Anomotaenia praecox*; that described by Krabbe in 1879 has 18 hooks, 12 μ to 16 μ long and remains under the original name, while that found in *Delichon urbica* by Joyeux & Baer in 1936 and by Oshmarin in 1956 is made *A. chelidonariae* n.sp. and has 32 to 40 hooks, 8 μ to 10 μ long. The collection also contains specimens of *Anomotaenia* sp. which are similar to *A. praecox* but have a deeply lobed vitelline gland. *Dilepis hamasigi*, which was placed by Belopolskaya in 1953 in *Lateriporus*, now becomes a synonym of *Trichocephaloidis megaloccephala*. *Kowalewskiella cingulifera* n.comb. is made for *K. longianmulata* and *Choanotaenia cingulifera* which are synonyms. In addition to the new species, Spasskaya gives her own descriptions for *A. praecox*, *T. megaloccephala*, *Arctotaenia tetraboethrioides* and *Progynotaenia odhneri*.
G.I.P.

(492e) Babos describes *Heligmosomum barbastelli* n.sp. from the bat, *Barbastellus barbastellus*. This is the first *Heligmosomum* reported from bats. The cuticle of the new species has fine, longitudinal striations but it differs from the other three *Heligmosomum* species with this characteristic in having a gubernaculum, in the size of the eggs, in the presence of a spine on the tail of the female, and in the shape of the spicule.
A.E.F.

(492f) Egyed & Nemeséri report, after a series of experiments, that carbon tetrachloride against fascioliasis is best administered parenterally to sheep by intramuscular injections on the inner surface of the thigh. A mixture of equal parts of carbon tetrachloride and paraffin is recommended and the dose should vary between 4 ml. and 10 ml. according to weight. A single injection has been found to have a 90% efficacy. If necessary the treatment may be repeated after a month without harmful effects.
A.E.F.

(492g) Kassai shows that the more important protostrongylids of sheep in Hungary (*Cystocaulus ocreatus*, *Protostrongylus* spp. and *Muellerius capillaris*) each produce changes in the host's lungs of a specific character. The patho-morphological characteristics of the nodules and foci are differentiated and described in detail.
A.E.F.

493—Advances in Veterinary Science. New York.

- a. INNES, J. R. M. & SAUNDERS, L. Z., 1957.—“Diseases of the central nervous system of domesticated animals and comparisons with human neuropathology.” **3**, 33-196.
- b. GORDON, H. McL., 1957.—“Helminthic diseases.” **3**, 287-351.
- c. JONES, L. M., 1957.—“Antinematodal drugs.” **3**, 353-395.

(493a) In this detailed, comparative review, which it is intended later to expand into a book, Innes & Saunders lay stress on the pathology and pathogenesis of disorders of the central nervous system. There is a valuable section, 12 pages long, on helminthic infections of the central nervous system, which is divided into five subsections dealing with coenuriasis; cerebrospinal nematodiasis in goats, sheep and horses in the Far East; kumri in horses in India, Ceylon, Burma and Assam; ataxia in deer, moose, and other animals; and ovine neurofilariasis in the U.S.A.
J.M.W.

(493b) Gordon reviews at length both current concepts and recent advances in the field of veterinary helminthology. The principal topics treated are epizootiology, life-cycles, pathogenesis, immunity, control and techniques. Among other subjects the following receive special emphasis: the contrast between helminthic infection and helminthic disease; the continuous contamination of the environment and the importance of attacking the life-cycle in this stage; the flock or herd as the unit; the influence of husbandry and pasture management; parasite population dynamics; the role of helminthic disease in unthriftiness and performance; the nature of parasitic damage and the importance of immature parasites and histotropic stages; the nature and manifestations of immunity and the possibility of its application to control; anthelmintics; and field trials. Suggested trends in research are a fuller knowledge of immunity

and its application in control; a better knowledge of epizootiology; more elaborate animal and pasture management; and improved *in vitro* culture and other techniques. J.M.W.

(493c) A review is made of drugs currently in use as anthelmintics effective against nematode parasites of domestic stock. Phenothiazine and anticestodal drugs are deliberately omitted because of previous adequate reviews. No mention is made of drug control of fluke diseases. Properties of the ideal anthelmintic are listed as effectiveness, low toxicity, low cost, ease of administration and single-dose treatment. The value of drugs at present available is discussed in relation to these criteria. The various salts of piperazine are given considerable attention and are recommended for the treatment of ascariasis and oxyuriasis in a wide variety of stock and are also stated to be of value against *Oesophagostomum*, *Cyathostomum*, *Tridontophorus* and *Strongylus vulgaris*. Piperazine is considered to be the only drug of real value in treating ascariasis in chickens. The use of sodium fluoride and cadmium salts against ascariasis in pigs is described. Organic solvents such as toluene, carbon tetrachloride, tetrachlorethylene and *n*-butyl chloride are recommended for the treatment of hookworm infections in dogs; phthalofyne is the only specific for the treatment of whipworm in dogs. Hexylresorcinol is described as relatively non-toxic but not particularly efficacious against hookworm; oil of chenopodium and carbon disulphide are not recommended because of high toxicity. Drugs alone will not control parasitic infections and their use must be combined with good stock management. O.D.S.

494—Anais do Instituto de Medicina Tropical. Lisbon.

- a. FRAGA DE AZEVEDO, J., COSTA FARO, M. M. DA, MORAIS, T. DE & ALMEIDA DIAS, J. A. P. DE, 1957.—“As bilharzioses humanas no território de Manica e Sofala e na área da barragem do Limpopo (Moçambique).” **14** (1/2), 5–103. [English & French summaries pp. 98–102.]
- b. MORAIS, A. T. DE, 1957.—“Subsídios para o estudo das parasitoses intestinais humanas no Distrito da Zambézia.” **14** (1/2), 137–143. [English & French summaries pp. 142–143.]
- c. MORAIS, T. DE, 1957.—“As bilharzioses humanas do Distrito do Niassa (África Oriental Portuguesa).” **14** (1/2), 145–153. [English & French summaries p. 153.]
- d. MORAIS, T. DE, 1957.—“Aspectos das associações de parasitas intestinais mais frequentes no Distrito da Zambézia.” **14** (1/2), 155–158. [English & French summaries pp. 157–158.]

(494a) The general picture of schistosomiasis in the province of Manica Sofala, Mozambique, was similar to that already observed in neighbouring territories. *Schistosoma haematobium* eggs were found in the urine of 64·4% of 2,171 persons (mostly children) and in some villages all the inhabitants were infected. *S. mansoni* eggs were present in the faeces of 11% of 2,052 individuals but in two places on the River Revué 90% and 95% of the inhabitants examined were voiding eggs. Hypertrophy of the liver and spleen was more often associated with *S. mansoni* than with *S. haematobium*. *Physopsis* and, to a lesser extent, *Biomphalaria* were widespread in the area. *Pyrgophysa* was less common. Human-type schistosome cercariae were found in one of 154 *Physopsis* and two of 513 *Biomphalaria*. The ranges of concentrations of inorganic substances in the habitats of *Physopsis*, of *Biomphalaria*, of *Bulinus* (*Pyrgophysa*) *forskali* and in collections of water where no vectors were found are tabulated. The intermediaries were apparently as frequent at altitudes above 1,000 m. as at lower levels, showing that *Biomphalaria* lives well in relatively cold climates. In Guija, the irrigation area of the Limpopo river, 68 of 100 schoolchildren had schistosomiasis haematobia and only two of 98 showed *S. mansoni* infection. In the cemented canals of Guija scarcely any molluscs were found other than *Pyrgophysa*. M.McK.

(494b) The faecal examination of 1,800 natives aged three to twenty-two years in Zambézia, Mozambique, showed hookworm in 53·61%, *Ascaris* in 21·55%, *Trichuris* in 10·38% and *Strongyloides* in 10·88%. With the exception of *Strongyloides* these helminths were present in all the regions of Zambézia. Tapeworm and *Enterobius* infections were found in two persons. The incidence of schistosomiasis in this group has been reported elsewhere [for abstract see Helm. Abs., **25**, No. 53c]. M.McK.

(494c) *Schistosoma haematobium* was found in 70·53% and intestinal schistosomiasis in 5·78% of 380 children in the Niassa district of Mozambique. M.McK.

495—Annales de Médecine Vétérinaire.

- a. GRÉGOIRE, C., 1957.—“Bilan de la pathologie parasitaire.” **101** (6), 403-419.
- b. SCHYNS, P., THOMAS, J., COTTELEER, C., GRÉGOIRE, C. & POUPLARD, L., 1957.—“Les helminthiases aviaires.” **101** (6), 434-444.
- c. GRÉGOIRE, C., POUPLARD, L., COTTELEER, C., SCHYNS, P. & THOMAS, J., 1957.—“Bilan de l'infestation parasitaire par *Dictyocaulus viviparus* et par les strongylides gastro-intestinaux chez les bovidés en Belgique.” **101** (7), 481-486.

(495a) Grégoire stresses the importance of parasitic diseases in veterinary medicine, pointing out that their prevalence and severity are largely the result of conditions created by man. He reviews some general aspects of veterinary parasitology. J.M.W.

(495b) Schyns *et al.* review the whole problem of helminthic infection in domestic poultry in Belgium. The principal species involved and their prevalence, as revealed by autopsies carried out during 1955-56 were: *Davainea proglottina*, 36%; *Amoebotaenia sphenoides*, 2.3%; *Raillietina tetragona*, 2.3%; *R. cesticillus*, 3.5%; *Ascaridia galli*, 8.1%; *Heterakis gallinae*, 16%; *Capillaria columbae* or *C. caudinflata*, 61%; *Syngamus trachea*, 2.3%. The pathological effects of these infections (together with coccidiosis) are briefly reviewed from the statistical point of view. The rest of the paper is devoted to a review of methods of treatment available for helminthiasis in poultry. After listing the principal nematocides and taenifuges with their dosage and efficacy, the authors discuss in detail recent work on piperazine derivatives, cadmium compounds and organic compounds of tin. J.M.W.

(495c) Grégoire *et al.* investigated the importance of verminous bronchitis, due to *Dictyocaulus viviparus*, and gastro-intestinal trichostrongylosis in cattle in Belgium by autopsy and field observation. They found that the former disease appeared early in the year but produced its most severe effects and principal mortality in the autumn. In October the incidence could be as high as 81%. The latter disease was due to any or all of the following worms, here listed in order of frequency and importance: *Ostertagia ostertagi*, *Trichuris bovis*, *Cooperia oncophora*, *Nematodirus filicollis*, *C. punctata*, *O. circumcincta*, *Trichostrongylus extenuatus*, *Bunostomum phlebotomum*, *Oesophagostomum radiatum* and *Capillaria bovis*. *Ostertagia ostertagi* was the predominating species, and the most important from the point of view of pathological effects. Trichostrongylosis usually manifests itself by a state of malnutrition in young cattle with resulting retardation of growth and reduction in productivity. Nevertheless, in certain localities, where conditions are favourable to the disease, mortality may be high. J.M.W.

496—Annales de Parasitologie Humaine et Comparée.

- a. EUZET, L., 1957.—“Recherches sur les Monogeneoidea parasites de poissons marins.” **32** (5/6), 469-481.
- b. LOBATO-PARAENSE, W. & DESLANDES, N., 1957.—“*Biomphalaria boissyi*, synonyme probable de *Taphius nigricans*.” **32** (5/6), 482-490.
- c. DOLLFUS, R. P., 1957.—“Suppression du nom *Seurocyrnea* Embrik Strand 1929 nomen novum.” **32** (5/6), 590.

(496a) Euzet describes the oncomiracidia of ten species of Monogenea parasitic on marine fish and discusses the implications of his observations from the point of view of the classification of the group. *Lamellodiscus ignoratus*, *Amphibdelloides maccallumi*, *Trochopus pini*, *Microcotyle erythrimi*, *Octostoma scombri*, *Grubea cochlear* and *Erpocotyle torpedinis* are treated in considerable detail, and *Ancyrocephalus vanbenedenii*, *Cyclocotyla bellones* and *Hexabothrium canicula* in somewhat less detail. In all cases the number and arrangement of the larval hooks are given. S.W.

(496c) Dollfus points out that the generic name *Cyrnea* used once by Deshayes in his article published in 1858 was merely a typographical error for *Cyrena* Lamarck, 1818, which was used correctly several times. As Embrik Strand was therefore not justified in treating *Cyrnea* as a homonym of *Cyrena*, the new name *Seurocyrnea* which he substituted for *Cyrnea* Seurat, 1914, in 1929, must be suppressed.

R.T.L.

497—Annales de la Société Belge de Médecine Tropicale.

- a. GILLET, J., SMET, R. M. DE, WOLFS, J. & DELPERDANGE, G., 1957.—“Essais thérapeutiques de la bilharziose expérimentale et humaine à *Schistosoma mansoni* avec les sels d'étain.” **37** (6), 835–840. [English, German, Spanish & Flemish summaries pp. 839–840.]
- b. ROELS-BROADHURST, D. & DE MAEYER, E. M., 1957.—“Le phosphate de pipérazine comme moyen de traitement de l'ascaridiose en milieu coutumier.” **37** (6), 925–931. [English, German, Spanish & Flemish summaries pp. 930–931.]
- c. HUYGELEN, C., 1957.—“Le traitement d'un cas de bilharziose canine à *Schistosoma rodhaini* par un dérivé du thioxanthone.” **37** (6), 993–997. [English, German, Spanish & Flemish summaries pp. 995–996.]

(497a) A group of white mice infected with *Schistosoma mansoni* were treated by intraperitoneal injection of tin citrate given as a 10% solution. A total of 676 mg. per kg. body-weight of tin was given by daily injection over eight days. Ten to eleven days after completion of treatment the mice were killed and examined for distribution of schistosomes within the hepatic portal system. Distribution was abnormal in that a high percentage of the worms were seen to be present in the portal vein. In one mouse killed one day after treatment, 80% of the schistosomes were found in the liver. It was concluded that some anthelmintic effect had been obtained. Following this experimental observation, 17 Congolese adults with mild intestinal schistosomiasis were treated with 4.0 gm. of stannous oxide, given in divided dose, daily for eight days. Three courses of treatment were given, with an interval of eight days between courses. During the whole period of treatment and up to 12 days afterwards the stools were examined by direct smear and hatching techniques. No cures were obtained and the trial ended in failure.

O.D.S.

(497b) Of 231 children of 3–12 years in the Kivu province of the Belgian Congo, 21% were found to be infected with *Ascaris lumbricoides*. Infection was also found in very young children of 6 to 12 months. The incidence in adults was similar to that of the 3 to 12-year-old group. Of 196 children treated with piperazine phosphate at 900 to 1,500 mg. per day for six days, 168 (86%) were negative for *Ascaris* ova upon stool examination ten days after treatment. Of those cured, more than 50% had passed all their worms by the second day of treatment although in some instances worms continued to appear up to the sixth day. Treatment with piperazine phosphate was not toxic in the dosage employed.

O.D.S.

(497c) Infection with *Schistosoma rodhaini* was found in two dogs in the Elisabethville district. One dog was treated with antimosan by seven injections (dose not stated) given at intervals of two to three days. Examination five weeks after the end of treatment showed no ova in the faeces. The second dog was given a course of treatment with lucanthone hydrochloride (Tixantone); 2,400 mg. was administered in seven daily doses of about 70 mg. per kg. body-weight. Apart from one bout of vomiting no side effects were observed and from the seventh day after commencement of treatment no viable eggs were found in the faeces.

O.D.S.

498—Annals of Zoology. Agra.

- a. JAIN, S. L., 1957.—“*Mizelleus indicus* n.g., n.sp. (subfamily Tetraonchinae), from the gill filaments of *Wallagonia attu* (Bloch).” **2** (5), 57–64.

(498a) *Mizelleus indicus* n.g., n.sp. from *Wallagonia attu*, a common fresh-water fish in India, belongs to the Tetraonchinae but differs from the known genera in having a three-piece ventral bar and conspicuous side connectives articulating with the dorsal bar and with the supporting bars. The sinistral position of the vagina clearly distinguishes it from *Urocleidus*.

R.T.L.

499—Archiv für Geflügelkunde.

- a. SCHÜRMANN, E. & GREUEL, E., 1957.—“Vergleichende Untersuchungen über die Wirksamkeit und Verträglichkeit verschiedener Wurmmittel bei der Bekämpfung der Ascaridiasis des Geflügels. Erste Mitteilung.” **21** (1), 16–28. [English summary p. 26.]
- b. SCHÜRMANN, E. & GREUEL, E., 1957.—“Vergleichende Untersuchungen über die Wirksamkeit und Verträglichkeit verschiedener Wurmmittel bei der Bekämpfung der Ascaridiasis des Geflügels. Zweite Mitteilung.” **21** (1), 29–32. [English summary p. 32.]
- c. SCHÜRMANN, E. & GREUEL, E., 1957.—“Vergleichende Untersuchungen über die Wirksamkeit und Verträglichkeit verschiedener Wurmmittel bei der Bekämpfung der Ascaridiasis des Geflügels. Dritte Mitteilung.” **21** (4), 246–251. [English summary p. 251.]

(499a) Schürmann & Greuel have tested a number of substances against *Ascaridia galli* in the domestic fowl. Phenothiazine, “K.N. capsules” [no information, except that they contain various anthelmintics including phenothiazine], and the proteolytic enzyme preparation Vermizym all failed to control infection when given either in the recommended dose or when this amount was doubled. On the other hand, piperazine citrate, in a dosage of 500 mg. was practically 100% effective. A.E.F.

(499b) Schürmann & Greuel administered piperazine citrate to 35 survivors from a flock of 60 pigeons heavily infected with *Ascaridia columbae*. A single dose of 250 mg. was given to each bird and within a few hours both immature and adult worms were being passed: in one or two cases well over 100 worms were recovered from a single pigeon. The general condition of the pigeons also improved. It is concluded that piperazine citrate, because of its efficacy and because it is so well tolerated is the remedy of choice against *Ascaridia* in pigeons. A.E.F.

(499c) Schürmann & Greuel have tested the effect of piperazine citrate when used against *Ascaridia*, on egg production in the domestic fowl. Three groups, each of 100 hens, were housed separately. Each hen in group I was given 500 mg. in capsule form; those in group II were given 250 mg. each; while group III were given mass treatment by dissolving 50 mg. of piperazine citrate in 10 litres of water. Egg production was compared with that preceding drug administration and in none of the three groups was the general condition of the birds or their egg production affected. A.E.F.

500—Archives of Disease in Childhood.

- a. BROUGHTON, M. E., 1957.—“Hydatid cyst of the kidney in a child.” **32** (165), 466–468.

501—Archives de l'Institut Pasteur du Maroc.

- a. DOLLFUS, R. P., 1957.—“Miscellanea helminthologica maroccana XIX. Nouvelles récoltes d'*Oochoristica* chez des sauriens du Maroc.” **5** (7), 272–299.
- b. DOLLFUS, R. P., 1957.—“Miscellanea helminthologica maroccana XX. Contribution à la connaissance des *Nematotaenia*.” **5** (7), 300–328.
- c. DOLLFUS, R. P., 1957.—“Miscellanea helminthologica maroccana XXI. Quelques cestodes d'otidiformes, principalement d'Afrique du Nord. Répartition géographique des cestodes d'otidiformes.” **5** (7), 329–402.
- d. DOLLFUS, R. P., 1957.—“Miscellanea helminthologica maroccana XXII. Annotations au sujet de divers acanthocéphales dont il a été question dans *Miscellanea helminthologica maroccana* I (1951) et XI (1953).” **5** (7), 403–407.

(501a) Dollfus briefly discusses the species of *Oochoristica* and gives an addendum to his previous list [for abstract see Helm. Abs., **23**, No. 365g] of saurians and ophidians which are parasitized by members of this genus. Three new forms are described: (i) *O. rostellata* Zschokke, 1905 var. *agamicola* n.var., from eight specimens from the gut of *Agama bibroni* from south-western Morocco, differs from the type form in the following characters: the length and breadth are both less; the width of the scolex at the level of the suckers is usually greater; the proglottides are never longer than wide; the testes are irregular in shape; the ovary is more elongated transversely; and the eggs are smaller. (ii) *O. darensis* n.sp. (from ten specimens from the gut of an *Uromastix acanthimurus* from south-western Morocco) is distinguished from other species of the genus by the combination of the following characters: the number of testes

(50-70); the transverse diameter of the ovary (136-298 μ); and the fairly strong musculature of the genital atrium. (iii) *O. pseudocotylea* n.sp. (from the intestine of *Eumeces algeriensis* from the Casablanca area) has the following principal diagnostic characters: scolex 420-460 μ wide; ratio of width of ovary to width of proglottis 21-22⁰/₁₀; vagina with a fusiform seminal receptacle; oncospheres 36-50 μ .
W.A.F.W.

(501b) Dollfus describes six different lots of *Nematotaenia dispar* (Goeze, 1782) and notes differences between this material and previous descriptions of the species in the length of the cirrus pouch and the size of the oncospheres. *N. dispar* var. *algeriensis* n.var. (27 fragments from a *Bufo mauritanicus* from Algeria) is distinguished by the paruterine organ forming a structure like a tuft of spines and by the length of the cirrus pouch. *N. dispar* var. *chantalae* n.var. (specimens from the intestine of *B. mauritanicus* from Rabat and Casablanca) is distinguished from the type form by size differences and by the shape of the eggs. Dollfus considers that differences only in dimensions separate *N. dispar* from *N. tarentolae* López-Neyra, 1944 and that the latter therefore remains *sub judice*.
W.A.F.W.

(501c) Dollfus describes cestode material, including one new species, collected from otidiform birds: *Hymenolepis villosa* (Bloch, 1782) from *Chlamydotis undulata* in Morocco and *Tetrax tetrax* in Touraine; *Ascometra vestita* Kholodovski, 1912 from *C. undulata* in Morocco; *Otiditaenia conoideis* (Bloch, 1782) from *Choriotis arabs* in Morocco, *Neotis cafra denhami* and *N. cafra* in French Sudan; *Idiogenes otidis* Krabbe, 1868 from *C. arabs* in Morocco and *T. tetrax* in Touraine; *I. nana* Fuhrmann, 1925 from *C. undulata* in Morocco; *I. kolbei* Ortlepp, 1938 var. *nanior* n.var. from *N. cafra denhami* in French Sudan; immature *Idiogenes* and *Otiditaenia* from *C. arabs* in Mauretania; *I. kolbei* from *Eupodotis senegalensis* in French Sudan; *Raillietina* (R.) *eupodotidis* n.sp. from *E. senegalensis* in French Sudan. *I. kolbei* var. *nanior* is characterized by the small width of the scolex and strobila and the shortness of the cirrus pouch. *R. eupodotidis* differs from the only other species of *Raillietina* hitherto recorded from an otidiform and is therefore considered new. Lists are given showing (i) cestodes which have been found in Otidiformes and the species of host and the geographical location; (ii) Otidiformes in which cestodes have been found, and the species of cestodes. Of the cestode genera which are known from Otides, (*Hymenolepis*, *Raillietina*, *Idiogenes*, *Chapmania*, *Ascometra*, *Otiditaenia* and *Sphyrnocola*) only *Sphyrnocola* has not been found in other birds. None of the 18 species of cestodes which are known from Otides have been found in birds of the sub-orders Rallies or Grues of the Otidiformes.
W.A.F.W.

(501d) Dollfus discusses the status and synonymy of *Echinorhynchus brumpti* Blanc & Cauchemez, 1911; *Prosthorhynchus cylindraceus* (Goeze, 1782); *E. rosai* Porta, 1910; *Centro-rhynchus picae* Dollfus, 1953; *E. picae* Rudolphi, 1819; *Gordiorhynchus* Meyer, 1931; *Prosthorhynchus charadriicola* Dollfus, 1953; and *Plagiorhynchus charadriicola* (Dollfus, 1953).
W.A.F.W.

502—Archivio Italiano di Scienze Mediche Tropicali e di Parassitologia.

- a. BONDI, M., SANTORO, R. & SAVINI, R., 1957.—“Studio statistico di cinquanta casi di idatidosi.” 38 (9), 449-464. [English, French & German summaries pp. 462-464.]
- b. SAVINI, R., 1957.—“L'anchilostomiasi tra la popolazione nel corso medio del fiume Topino (Umbria).” 38 (9), 484-493. [English, French & German summaries pp. 492-493.]

503—Arkiv för Zoologi.

- a. MALMBERG, G., 1957.—“On a new genus of viviparous monogenetic trematodes.” Ser. 2, 10 (4/5), 317-330.

(503a) Malmberg describes and figures *Macrogryrodactylus polypteri* n.g., n.sp. from the skin and fins of *Polypterus senegalus* in Gambia. The new genus is viviparous and resembles *Gyrodactylus* and *Gyrodactylodes* in general anatomy but the presence of a receptaculum seminis and the unusual structure of the opisthaptor distinguish it from them. Some lines of development in the Gyrodactylidae are discussed.
S.W.

504—Arquivos da Escola Superior de Veterinária. Universidade Rural do Estado de Minas Gerais.

- a. SOUZA COUTO, E. & FREITAS, M. G., 1957.—“Ensaio de tratamento da habronemose gástrica dos equídeos.” **10**, 117–120. [English summary p. 120.]
- b. FREITAS, M. G., 1957.—“Efeitos de alguns detergentes sobre o desenvolvimento dos ovos e larvas de *Stephanurus dentatus* Diesing, 1839 (Nematoda).” **10**, 225–249. [English summary pp. 245–247.]
- c. FREITAS, M. G., 1957.—“Lista de helmintos parasitos dos animais domésticos de Minas Gerais.” **10**, 373–381.

(504a) No anthelmintic effect was observed after 28 out of 32 horses with *Habronema* infections had been treated with a single dose of 200 ml. of liquid paraffin (mixed with 15 ml.—20 ml. of carbon disulphide, 75 ml. of carbon tetrachloride or 10 ml. of chenopodium oil) given on an empty stomach. M.McK.

(504b) The power of four detergents to kill or inhibit the development of the free-living stages of *Stephanurus dentatus* was studied by mixing the eggs or larvae with solutions of the detergents or with sandy soil moistened with solutions of the detergents. The most powerful agent was Duponol C (a mixture of double alkyl and sodium sulphates, consisting mainly of lauryl and sodium sulphate) of which a 0.05% solution, tested in the laboratory in the absence of sand, killed all eggs and pre-infective larvae. 0.2% Duponol RA (an alkyl sulphate, 35% active ingredient), 0.4% Tergitol 4 and 0.4% Tergitol P-28 appeared in the laboratory to be suitable for the destruction of the pre-infective stages; these three detergents were generally less effective when tested out of doors. Duponol C is provisionally recommended at a concentration of 0.05% for the dusting and washing of cement floors in pig houses to destroy the eggs and pre-infective larvae and at a concentration of 1% for destroying infective larvae in the ground. M.McK.

(504c) Freitas lists the helminths which have been found in the State of Minas Gerais, Brazil in equines, cattle, sheep, goats, pigs, dogs, cats, rabbits, domestic fowl, pigeons, ducks and turkeys. M.McK.

505—Arquivos do Instituto Biológico. São Paulo.

- a. ORLANDO, A., 1957.—“O valor do óleo de quenopódio e das plantas de ‘erva de Santa Maria’ —*Chenopodium ambrosioides* L. var. *anthelminticum* (L.) Gray no controle a nematoides que atacam raízes de vegetais cultivados.” **24**, 69–80. [English summary p. 79.]

(505a) Tests were carried out in the field and in pots to determine whether aqueous extracts, total constituents or oil, extracted from *Chenopodium ambrosioides* var. *anthelminticum* were effective in controlling *Meloidogyne javanica*. There was no appreciable reduction in galling of the test plants, even when several applications of the materials were made. M.T.F.

506—Australian Veterinary Journal.

- a. BANKS, A. W., 1957.—“A nomogram for doses of drugs, particularly phenothiazine.” **33** (10), 254–255.
- b. DURIE, P. H., 1957.—“The relationship between intestinal cell fat content and infectivity of the third stage larvae of the bovine stomach worm *Haemonchus placei* (Place 1893) Ransom 1911.” **33** (12), 305–306.

(506a) Banks has produced a nomogram offering practical assistance to the farmer in calculating the amount and cost of phenothiazine required for the treatment of helminthic infections in sheep. The nomogram is in two parts. In the first part, given the body weight and recommended dose rate in mg. per kg., the actual dose may be calculated, either as pure phenothiazine or as 50% suspension. In the second part, given the calculated dose, the nomogram provides an estimate of the total amount of drug required and cost of dosing 100 head of sheep. Costs are calculated in the current price of phenothiazine in Australia. The nomogram can be adapted for any drug or any animal. O.D.S.

(506b) Durie reports that very heavy infections with *Haemonchus placei* were obtained by feeding worm-free calves with larvae which had lost all their fat after storage at 26°C. for 14 days and he concludes that the presence of fat is not essential for infectivity. Only a very low yield of adult worms was obtained by similarly feeding calves with third-stage larvae less than 24 hours old, which contained a maximum of intestinal fat and such larvae may therefore require a period of "ageing" after moulting before they reach optimum infectivity. J.M.W.

507—Avian Diseases. Ithaca.

- a. RAGGI, L. G. & BAKER, N. F., 1957.—"Case report—*Tetrameres americana* (Cram, 1927) infection in domestic pigeons." **1** (2), 227-234.

(507a) Raggi & Baker describe a natural outbreak of *Tetrameres americana* together with *Dispharynx nasuta* in domestic pigeons in California, U.S.A. In 1953 four dead pigeons from a flock of 65, approximately 18 months in age, were examined and lesions of the proventriculus were found that had been produced by *T. americana*. A brief account of the pathological condition is given with notes on the distinguishing features of *T. americana* and *D. nasuta*. The ground where the pigeons were raised was heavily infested with pillbugs, *Armadillidium* spp., and sowbugs, *Porcellio* spp., which, according to Raggi & Baker, are capable of acting as intermediate hosts to the above parasites. Reduction in the numbers of pillbugs and sowbugs, obtained by allowing young chickens to feed on the infested ground, adequately controlled the spread of the parasites amongst the pigeons. I.C.W.

508—Berliner und Münchener Tierärztliche Wochenschrift.

- a. NICLAS, A., 1957.—"Ist es erforderlich, im neuen Fleischbeschaugesetz die Leberuntersuchung bei Schweinen besonders zu regeln?" **70** (14), 314-315.

(508a) Niclas reports that of 2,000 pig livers examined at the Gelsenkirchen abattoir, and which outwardly showed no signs of parasitic infection, 4% to 5% revealed hydatid or *Cysticercus tenuicollis* infection when an incision was made between the left lateral and left central lobes of the liver. Very similar results were obtained at Essen and at Koblenz—where 3,000 pigs were examined. Niclas points out that this particular incision is not prescribed by the German Meat Inspection Laws and suggests that provision for it should be included in revised legislation. A.E.F.

509—Bihar Animal Husbandry News.

- a. VARMA, A. K., 1957.—"What are parasites and why should we worry about them?" **2** (1), 10-13.

510—Biológia. Bratislava.

- a. KAŠTÁK, V., 1957.—"Helminthofauna štúk (*Esox lucius*) Oravskej priehrady." **12** (2), 102-112. [German & Russian summaries pp. 111-112.]
- b. KAŠTÁK, V., 1957.—"Nový druh monogenetickej cicavice z rodu *Dactylogyrus* Diesing, 1850 u *Barbus meridionalis petényi* (Heck.)." **12** (2), 137-139. [German & Russian summaries p. 139.]
- c. BIROVÁ, V. & BUŠA, V., 1957.—"K nálezu trematódov z rodu *Prosthogonimus* Lühe, 1899 u kačice domácej (*Anas boschas domestica*) a morky (*Meleagris gallopavo*) na Slovensku." **12** (4), 288-291. [English, German & Russian summaries p. 291.]
- d. DYK, V., 1957.—"Dynamika endoparasitů ryb tatranských jezer." **12** (5), 333-351. [German & Russian summaries pp. 349-351.]
- e. HOZA, E., 1957.—"Vztah vlhkosti a teploty k rozšíření askaridózy na území Slovenska." **12** (7), 501-509. [German & Russian summaries pp. 508-509.]
- f. MACKO, J. K., 1957.—"K výskytu trematódov krkavcovitých východného Slovenska." **12** (7), 510-516. [German & Russian summaries pp. 515-516.]
- g. HOZA, E., 1957.—"Trichocefalóza u školskej mládeže na Slovensku." **12** (8), 605-610. [German & Russian summaries p. 610.]

- h. ONDERÍKOVÁ, V., 1957.—“*Batrachobdella paludosa* (Carena 1823), Glossiphonidae Hirudinea na Žitnom ostrove.” **12** (10), 776–779. [German & Russian summaries pp. 778–779.]
- i. ČÁKAY, E., 1957.—“*Sterliadochona ssavini* Skrjabin, 1946 nový parazit našich pstruhov.” **12** (11), 863–866. [French, German & Russian summaries p. 866.]
- j. ČÁKAY, E., 1957.—“Nález *Philometra sanguinea* (Rudolphi, 1819) na Slovensku.” **12** (12), 909–914. [German & Russian summaries p. 914.]

(510a) Kašták reports on the helminth fauna of pike in the Orava artificial lake. 71·76% of 46 specimens examined showed helminthic infection. The following species of worms were present: *Tetraonchus monenteron* in 58·6%, *Triaenophorus tricuspidatus* in 47·8% and *Raphidascaris acus* in 46%. Young fish were not infected but the incidence of infection increased with host age from two years upwards. 91·6% of pike four years old or over were infected with *Tetraonchus monenteron*. N.J.

(510b) Kašták describes a new species of monogenetic trematode—*Dactylogyrus petényi* n.sp.—from *Barbus meridionalis petényi* in the Košice region. The new species, which is 0·5–0·57 mm. in length and 0·17–0·2 mm. in breadth is differentiated from previously described species of the genus by the form of the sickle-like hooks having two prominences, of which the ventral one is much shorter. N.J.

(510c) Bírová & Buša give a detailed description of *Prosthogonimus pellucidus* found in two of 241 domestic ducks examined and *P. cuneatus* found in two of 40 turkeys examined. Both trematodes were localized in the oviducts, but *P. pellucidus* was also found in the bursa Fabricii. N.J.

(510d) Dyk gives an extensive report on the dynamics of endoparasites of fish in three lakes in the Tatry mountains. Larval, young and adult forms of *Crepidostomum farionis* and *Neoechinorhynchus rutili* were found in 140 specimens, chiefly salmonids. In the lowest situated lake (Nové Štrbské) 90·91% of the stream trout were infected with *Crepidostomum farionis* in June, 74·2% in August and in September, after a dry summer, only 20%. In a lake at high altitude (Popradské tarn) the incidence of infection with *C. farionis* in July was much lower than in the other lakes. It increased in August to fall again in September. The incidence of infection with *N. rutili* in stream trout and other salmonid fish from Štrbské tarn increased to 100% from July to September. It was without seasonal changes in the Popradské tarn. N.J.

(510e) Hoza reports on the influence of humidity and temperature on the dissemination of human ascariasis. A total of 23,016 children aged from 9 to 11 years was examined in four different areas of Slovakia. The incidence of infection in dry regions was about 5·8%; in semi-dry regions approximately 14·6%; and in humid regions about 27·8%. In regions with different mean annual temperatures the percentage of children infected also varied as follows: (i) 3·5°C., 31·4%; (ii) 5°C. to 7°C., 21·6%; (iii) 7°C. to 9°C., 14·3%; (iv) 9°C., 11%. N.J.

(510f) Macko describes the trematodes found in 105 specimens of *Corvus frugilegus*, 13 specimens of *C. corone cornix*, 10 specimens of *Coloeus monedula*, 22 specimens of *Pica pica* and 29 specimens of *Garrulus glandarius*. All the birds were shot in eastern Slovakia. 10·34% of *G. glandarius* were infected with *Lyperosomum petiolatum*, 3·44% with *Brachylecithum lobatum* and 3·44% with *Brachylaemus arcuatus*. The incidence of infection with *Brachylecithum* sp. in *Corvus frugilegus* was 0·95%. The author also mentions that the size and location of certain organs of his specimens differed from those given in the descriptions of other authors. N.J.

(510g) Hoza reports on infection with *Trichocephalus* among schoolchildren in Slovakia. 2,016 children were examined from 535 localities. Incidence ranged from 11·5% to 57% and was not less than 10% in any region. 15·7% of the children from a locality with a purified main water supply and a drainage system were infected, whereas where there were no such installations the incidence of infection was 33·6%. N.J.

(510h) Onderíková reports on a specimen of *Batrachobdella paludosa* found on Žitné island, which differed from typical specimens of this species in size and colouring. The author speculates whether these differences are due to age or whether they indicate the existence of a new ecological form. N.J.

(510i) Čáky describes in detail *Sterliadochona ssavini* Skryabin from *Salmo trutta* m. f. and *S. gairdnerii*. The parasite was found for the first time in the upper Nitra, where 100% of trout were found to be exclusively infected with this species. The fish were in good condition. N.J.

(510j) Čáky reports on *Philometra sanguinea*, found for the first time in Slovakia in the old bed of the River Váh in 60% of 20 specimens of *Carassius carassius* examined. The worms were localized in the caudal fin or, more rarely, in the dorsal fin. The examination of 27 specimens of other Cyprinidae was negative. N.J.

511—Biologia. Lahore.

- a. SARWAR, M. M., 1957.—“*Fasciola indica* Varma, a synonym of *Fasciola gigantica* Cobbold.” **3** (2), 168–175.
- b. SARWAR, M. M. & RAUF, A., 1957.—“A short note on the morphology of cercaria of *Fasciola gigantica*, with a discussion on the composition of different larval forms of the fluke occurring in *Limnaea rufescens*.” **3** (2), 205–210.

(511a) In 1855 Cobbold described as a new species *Fasciola gigantica* obtained from the liver of a giraffe. Blanchard in 1896 suggested that *F. hepatica* var. *augusta* Railliet, 1895 from cattle in Senegal and *F. hepatica* var. *aegyptiaca* Looss from cattle in Egypt belonged to Cobbold's species. Jackson in 1921, having re-examined Cobbold's type material and fresh material from Burma, Rhodesia and East Africa, considered that all these specimens belonged to *F. gigantica*. In 1953, however, Varma differentiated the asiatic flukes from those reported from Africa and named the former *F. indica*. From a detailed examination of ten specimens from a buffalo from Pakistan, Sarwar finds that the specific differences upon which Varma based his *F. indica*, viz., the size of the body, the prominent shoulders, the more massive anterior conical portion and the posterior tapering of the body, its broader, stouter and more bluntly edged scales, the smaller number of gut branches and the relatively broader eggs, are merely individual variations and concludes that *F. indica* is a synonym of *F. gigantica*. R.T.L.

(511b) Sarwar & Rauf give a short account of the morphology of the cercaria of *Fasciola gigantica*. The authors then present data on the number and composition of rediae at different times of year and in snails of various sizes which show that secondary rediae are produced throughout the year and that the character of the infestation may be related to the age of the snail host. P.K.

512—Biological Bulletin.

- a. STUNKARD, H. W., 1957.—“The morphology and life-history of the digenetic trematode, *Microphallus similis* (Jägerskiöld, 1900) Baer, 1943.” **112** (2), 254–266.

(512a) Stunkard amplifies the information published in *Biol. Bull.*, 1956, **111**, p. 295 [for abstract see *Helm. Abs.*, **25**, No. 369b] with a detailed account of the life-history of *Microphallus similis*. The miracidia emerge from the eggs only after they have been eaten by the first intermediary (*Littorina obtusata* was used in the experimental work) and produce two generations of sporocysts. The cercariae are minute stylet-bearing monostomes and are identified as *Cercaria ubiquita*, confirming Rees' opinion that this was the larval stage of *M. similis*. These are extremely infective to *Carcinides maenas* but *Limulus polyphemus* was refractory to infection. The metacercariae become almost full grown in the crabs; the cysts are at first oval and thin-walled, but become spherical and much thicker-walled as they develop; the adults in *Larus argentatus* and *Sterna hirundo* increase further in size only by the activity of the reproductive organs and the accumulation of eggs in the uterus. S.W.

513—Bird Study.

- a. CLAPHAM, P. A., 1957.—“Helminth parasites in some wild birds.” **4** (4), 193-196.

(513a) Twenty-two species of birds shot or collected dead on the Hampshire-Dorset boundary were examined for helminths and the cause of their deaths. Although intestinal infections were heavy in birds dying of disease or starvation, in only two mallards were helminths (*Amidostomum nodulosum*) believed to be the cause of death [although a list quotes also capillariasis as the reason for the death of a goshawk and a peregrine]. Rooks and starlings, particularly young ones, were heavily infected with *Syngamus trachea*, and *Capillaria contorta*, *Polymorphus boschadis*, *Hymenolepis* spp. and, for rooks only, *Porrocaecum ensicaudatum* were also common. *Leucochloridium macrostomum* is recorded for the first time from *Troglodytes troglodytes*. G.I.P.

514—Botyu-Kagaku. Kyoto.

- a. KONDO, T., 1957.—[On the seasonal fluctuation of the population density of *Meloidogyne incognita acrita* in the sweet-potato field.] **22** (1), 144-149. [In Japanese: English summary p. 149.]

(514a) Larvae of *Meloidogyne incognita* var. *acrita* were extracted by Baermann funnel from 50 gm. samples of soil taken from five different depths in a sweet-potato field during the course of two years. Few larvae were found during winter: numbers increased in May and then declined after the planting of sweet-potatoes. In the second half of July and during August and early September large numbers were found and thereafter they decreased and practically disappeared after harvest. The population density was higher in the lower layers of soil during summer but higher in the upper layers in October and November. M.T.F.

515—British Journal of Pharmacology and Chemotherapy.

- a. MANSOUR, T. E., 1957.—“The effect of lysergic acid diethylamide, 5-hydroxytryptamine, and related compounds on the liver fluke, *Fasciola hepatica*.” **12** (4), 406-409.
b. GOODWIN, L. G., RICHARDS, W. H. G. & UDALL, V., 1957.—“The toxicity of diamino-diphenoxyalkanes.” **12** (4), 468-474.

(515a) Mansour has investigated the pharmacological properties of lysergic acid diethylamide (LSD), 5-hydroxytryptamine (5HT) and related compounds on the rhythmical movement of *Fasciola hepatica*. Two types of preparation were employed, the intact organism and a nerve-muscle preparation. The latter was prepared by cutting off that part of the fluke anterior to the ventral sucker, to remove the circum-oesophageal ganglion, and the body of the fluke was then cut longitudinally into two halves. The preparations were maintained in Ringer's solution in an isolated-organ bath at 38°C. and the movements recorded on a kymograph. Drugs were added to the medium in varying concentration. Both LSD and 5HT stimulated the rhythmical activity of the preparations at very low concentrations and were thus shown to act through the periphery and was not mediated through the circum-oesophageal ganglion. Other amines, notably indolamines, also stimulated rhythmical activity. Bromolysergic acid diethylamide, yohimbine, harmine and dopamine antagonized the stimulant action of 5HT and LSD and depressed rhythmical movement. The possibility of the presence of tryptamine receptors in the liver-fluke is discussed in the light of the experimental evidence obtained. O.D.S.

(515b) The toxic effects of certain members of a series of schistosomicidal diamino-diphenoxyalkanes were determined by oral and parenteral administration to mice, rabbits and cats. Large doses caused intravascular haemolysis in mice and rabbits and caused loss of hair in mice with the production of symmetrically distributed bald patches. Large doses of drug delayed water diuresis in mice. Primary amino-derivatives were more toxic than secondary methylamino compounds. Tertiary compounds were less toxic than either. Administration of the drug to cats produced retino-toxicity and a method of determining the relative potency of the compounds in this respect was devised. Essentially, this method related to the assessment of the ability of the frog retina to resynthesize rhodopsin after treatment of the animals with

representative members of the series of compounds. It was found that compounds that produced blindness in cats also inhibited rhodopsin synthesis in frog retina and that primary amines were more retinotoxic than secondary or tertiary amines. It was thought that the diaminodiphenoxyalkanes might interfere with vitamin A metabolism but diet supplements of vitamin A did not prevent the toxic effects of the drugs in treated animals. O.D.S.

516—Bulletin of the Clinical and Scientific Society Abbassiah Faculty of Medicine, Cairo.

- a. NAGATY, H. F., 1957.—“Report on a survey of ankylostomiasis and other parasitic infections in Syria.” 8 (2), 83–112.

(516a) Nagaty describes the ancylostomiasis survey which he undertook in Syria on behalf of the World Health Organization in 1955. Ascariasis (46%) was the most prevalent helminthic infection, followed by ancylostomiasis (24%), trichuriasis (19%), hymenolepiasis nana (11%) and trichostrongylosis (4%). Higher local incidence of trichostrongylosis was observed in a number of localities (e.g. Hawash 45%, Hawaiej 43%, Bagros 30%). The results were based on single faecal examination of 4,211 persons (365 adults and 3,846 children) selected from the 125 groups investigated with a total population of 24,460. Only 20 cases of *Taenia* infection, three of *Hymenolepis diminuta* and one of *Fasciola* were found. 45% of those examined were infected with one species of parasite, 26% with two species, 5% with three species and 0.5% with four species. 24% were free from helminthic infection. Ancylostomiasis is still a localized, rural disease in Syria, dependent on bare feet and promiscuous defaecation for its transmission. It should be controlled before it spreads further. Nagaty recommends mass treatment, supplementary diet, protection of the feet, disinfection of faeces or soil and prevention of soil pollution, combined with raising the social standard of the people and improvement of public health services. J.M.W.

517—Bulletin. Florida Agricultural Experiment Stations.

- a. KNORR, L. C., SUIT, R. F. & DuCHARME, E. P., 1957.—“Handbook of citrus diseases in Florida.” No. 587, 157 pp.

(517a) Among the many diseases covered in this bulletin Knorr *et al.* describe slow decline caused by *Tylenchulus semi-penetrans* (p. 32) and spreading decline caused by *Radopholus similis* (p. 118). The life-history of each eelworm is given and their effect on citrus trees described and illustrated. Methods for controlling the two diseases are described. A host list is given for both eelworms. Several other eelworm species parasitic on or associated with citrus are mentioned. D.J.H.

518—Bulletin of the Maryland Agricultural Experiment Station.

- a. JENKINS, W. R., TAYLOR, D. P., ROHDE, R. A. & COURSEN, B. W., 1957.—“Nematodes associated with crop plants in Maryland.” No. A-89, 25 pp.

(518a) From detailed examination of soil samples representing 1,210 farms and gardens throughout Maryland, the authors conclude that *Pratylenchus* spp. and *Tylenchorhynchus* spp. are probably the most serious crop pests. Less common but still important are species of *Meloidogyne*, *Helicotylenchus*, *Hoplolaimus* and *Paratylenchus*. *Xiphinema americanum* occurred very frequently but its pathogenic status is uncertain. Other stylet nematodes occurring frequently were *Aphelenchus*, *Ditylenchus* and *Tylenchus*, with *Aphelenchoides* less frequently. Data are given on the distribution of 21 genera of Tylenchida and 13 genera of Dorylaimoidea. It is estimated that plant-parasitic nematodes cause up to 20% reduction in crop yields in the State. R.D.W.

519—Bulletin Médical de l'Afrique-Occidentale Française.

- a. RAINAUT, J. & LARIVIÈRE, M., 1957.—“Etat de mal épileptique chez un sujet atteint de cysticercose sous-cutanée.” 2 (3), 325–328. [English summary p. 328.]

520—Bulletin. Ministry of Agriculture, Egypt. Veterinary Laboratories and Research Administration.

- a. EZZAT, M. A. E. & TADROS, G., 1957.—“Anthelmintic efficiency of piperazine against *Ascaridia* in poultry.” No. 281, 8 pp. [Arabic summary 4 pp.]

(520a) Piperazine adipate suspension was given to three groups of chickens infected with *Ascaridia* in dosage ranging from 150 to 350 mg. per kg. body-weight. The drug was given on three occasions with one month interval between the first and second dose and two months' interval between the second and third dose. Assessment of activity was based on worm counts in faeces on the days immediately after dosing and faecal egg counts at follow-up examination in a small number of birds that were examined post mortem. It is considered that a dose rate of 350 mg. per kg. is necessary to eliminate infection with adult worms but that the drug is ineffective against immature forms. O.D.S.

521—Bulletin of the National Institute of Animal Health, Tokyo.

- a. SASAKI, N., SATO, M. & SANO, K., 1957.—[Studies on skin microfilariasis of horses. IV. Therapeutic effect of 1-diethylcarbamyl-4-methyl piperazin citrate (Supatonin).] No. 32, pp. 235–250. [In Japanese: English summary p. 251.]

(521a) Horses suffering from “kasen” disease caused by microfilariae of *Onchocerca cervicalis* in the skin were treated with 1-diethylcarbamyl-4-methylpiperazine citrate (diethylcarbamazine, hetrazan, banocide, supatonin) at various dose regimens. [Route of dosing is not given in the English summary.] The dose in six horses was 9.25 mg., 14.84 mg., 14.95 mg., 19.51 mg., 20.41 mg. and 29.79 mg. per kg. body-weight daily for 10 days. In one further case the drug was given over three periods: 50.66 mg. per kg. daily for six days; 31.29 mg. per kg. for five days; 15.85 mg. per kg. for 10 days. In those horses treated with the lower dosage five responded with reduction of itch and skin eruptions and alleviation of the severity of the disease. Complete absence of symptoms followed treatment at 14.95 mg. per kg. in one case and 50.66 mg. per kg. The drug had little effect upon the microfilariae in the skin but was efficient in alleviating symptoms. It was more effective against the microfilariae of *Setaria equina*. Indication is given that a new technique was employed for determining the microfilarial counts in the skin. O.D.S.

522—Bulletin de l'Office International des Épizooties.

- a. MERLE, A., 1957.—“Enquête sur la trichinose.” 48, 95–103.
b. TRAWINSKI, A., 1957.—“La cysticerose chez les animaux et chez l'homme et spécialement la cysticerose du cerveau.” 48, 191–198. [English summary p. 197.]
c. TALAVERA, J., 1957.—“La cysticerose chez les animaux et chez l'homme et plus particulièrement la cysticerose cérébrale.” 48, 584–604.
d. KOTLAN, A., 1957.—“Epidémiologie et prophylaxie générale de la distomatose.” 48, 486–495. [English summary p. 495.]
e. POPOV, A., 1957.—“La distomatose en Bulgarie.” 48, 496–502.

(522a) Merle reports on the information furnished by a questionnaire sent out to the health authorities of 20 European countries and of a number of States in other parts of the world on the subject of trichinelliasis. He concludes that the infection in man is becoming increasingly rare in Europe, only some 40 cases being reported annually, the majority of them from Rumania. There also appears to be a drop in the number of infected pigs. Highest porcine infection rates in Europe were shown by Norway (2 per 100,000), Greece and Poland (20 per 100,000) and Rumania (40 to 190 per 100,000). In Germany, where the prevalence was formerly high, the rate has dropped to 0.278 per 100,000. In Africa and adjacent islands trichinelliasis is unknown. In Asia and Australia it is of minimal importance. Venezuela and Colombia are free of the infection. Greenland, where there are many wild reservoir hosts, shows a high prevalence (300 cases reported, 33 deaths in 1947). In Canada the prevalence in pigs is 500 per 100,000 and in the U.S.A. it is said to be 1,500. Improved culinary habits are believed to have contributed to the decrease of trichinelliasis in Europe. J.M.W.

(522b) Trawinski briefly reviews infection with larval tapeworms in pigs, cattle, sheep, goats, rabbits, wild boar, hare, roe-deer and fresh-water fish and infection with adult tapeworms (*Taenia solium*, *T. saginata* and *Diphyllobothrium latum*) in man. Special attention is given to cysticerciasis of the brain in man and its diagnosis. Measures for preventing the transmission of these infections from animals to man are outlined. J.M.W.

(522c) Talavera reviews *Cysticercus cellulosae* infection in pigs and *C. bovis* infection in cattle, and quotes a number of interesting figures regarding prevalence from various authors. He stresses the importance of cerebral cysticerciasis in man both by reason of its gravity and of its increasing frequency, and refers particularly to recent Spanish studies on this subject. In order to prevent human infection both with the adult tapeworms and with *C. cellulosae* it is necessary to introduce more rigorous prophylactic measures against cysticerciasis in animals, to locate and eradicate foci of human taeniasis, and to improve general hygienic conditions. J.M.W.

(522d) Kotlan reviews our present knowledge of the epidemiology and control of fascioliasis. Amongst the problems which are still unsolved the most important are the understanding of the immunology of the disease, the perfecting of biological and chemical means for destroying the snail intermediaries, the elucidation of the aetiology of acute fascioliasis and research on practical methods for avoiding contamination of the herbage. S.W.

(522e) Fascioliasis, due both to *Fasciola hepatica* and *F. gigantica* although the former is the more frequent, is a serious economic problem in Bulgaria. Popov outlines its distribution and describes the schemes now in operation for its eradication. The infection is not uncommon in man, especially amongst children of agricultural workers. S.W.

523—Bulletin de la Société de Chimie Biologique.

- a. FOUQUEY, C., POLONSKY, J. & LEDERER, E., 1957.—“Sur la structure chimique de l'alcool ascarylique isolé de *Parascaris equorum*.” 39 (1), 101–132.

(523a) Fouquey *et al.* found that “ascarylic alcohol” from the membranes of eggs of *Parascaris equorum* was a mixture of three glycosides called ascaroside A, ascaroside B and ascaroside C. Acid hydrolysis released the same sugar, a dideoxyaldohexose called ascarylose, from each glycoside. Ascaroside A gave one molecule of a normal secondary alcohol to one molecule of the sugar; ascarosides B and C gave one molecule of 2,6-dihydroxy-hentriacontane to one and two molecules of the sugar respectively. The ascarosides were esterified with acetic and propionic acid in unfertilized eggs. W.P.R.

524—Bulletin de la Société de Pathologie Exotique.

- a. MORETTI, G., GUIGNARD, J. & BESSE, P., 1957.—“Obturation complète de la veine cave inférieure et circulation collatérale cave-cave par un volumineux kyste hydatique du foie.” 50 (5), 780–787.
- b. CARNERI, I. DE, 1957.—“Conservation au laboratoire d'une souche de *Schistosoma mansoni*.” 50 (5), 787–794.
- c. MARILL, F. G., 1957.—“Le devenir du foyer algérien de bilharziose urinaire d'Inkermann-Saint-Aimé.” 50 (5), 794–804.
- d. LAGRANGE, E., 1957.—“Fécondité et régime chez *Planorbis glabratus*.” 50 (5), 804–811.
- e. VOUILLOUX, P. & VOELCKEL, J., 1957.—“Le tétrachloréthylène dans le traitement de l'ankylostomiase infantile.” 50 (5), 812–821. [Discussion p. 821.]
- f. McMULLEN, D. B. & HARRY, H. W., 1957.—“Observations sur l'épidémiologie de la bilharziose et sur la lutte contre cette maladie.” 50 (6), 901–916.
- g. SANKALE, M., RIVOALEN, A., MILHADE, J. & LE VIGUELLOUX, J., 1957.—“Considérations à propos d'un nouvel antibilharzien dérivé de la thioxanthone: le chlorhydrate de la 1-β-diéthylamino-éthylamino 4-6-8-triméthyl-5 azathioxanthone.” 50 (6), 917–923.

- h. CHIPPAUX, C. & CORNET, L., 1957.—“La place de la désoxybenzoïne basique dans le traitement de la bilharziose urinaire.” 50 (6), 923-929.
- i. DOBY, J. M., DOBY-DUBOIS, M. & DEBLOCK, S., 1957.—“Fréquence de la téniasse par *Taenia saginata* chez 3,000 enfants de la région de Yaoundé (Cameroun) détectée par la méthode de Graham.” 50 (6), 929-936.
- j. DOBY, J. M. & FOURCADE, R., 1957.—“L'ascaridiose et la trichocéphalose chez les enfants autochtones de la région de Yaoundé (Cameroun). Résultats récapitulatifs concernant le parasitisme intestinal par helminthes.” 50 (6), 937-945.

(524b) The author describes the technique by which *Schistosoma mansoni* has been maintained for more than two years in the laboratory, using *Australorbis glabratus* and white mice as hosts. S.W.

(524c) Vouilloux & Voelckel, in a comparative study of the efficacy of tetrachlorethylene and chenopodium oil against ancylostomiasis in infants, treated 250 children aged from a few months to six-and-a-half years. Details of the dosage regimens and statistical analyses of the results are given, the results of treatment being checked by egg counts the day before and 24 hours after dosing, egg counts on total faeces passed during the 24 hours preceding treatment and the third day after and counts of adult worms eliminated during the 24 hours after each dose. They conclude that in infants tetrachlorethylene gives better results than chenopodium oil and recommend five drops per kg. for children under two years old and six drops per kg. for those over in cases where, although infected, they are not suffering severely from the disease, and for children suffering profoundly from the disease three to four drops per kg. They did not find treatment to be more successful in anaemic patients. S.W.

(524f) McMullen & Harry present a critical review of current knowledge of the epidemiology of human bilharziasis in relation to the control of this infection. They stress the importance of employing a combination of all possible methods of attacking the disease, namely: (i) sanitation, especially the prevention of water pollution by human and reservoir host excreta; (ii) lowering of infection risk by education of the public, by provision of filtered or chlorinated drinking water, and by destruction of cercariae; (iii) eradication of molluscan vectors by ecological, biological and chemical methods; (iv) treatment of infected persons and reservoir hosts. Emphasis is laid on the need for further research. J.M.W.

(524g) A thioxanthone derivative, 1- β -diethylaminoethylamino 4-6-8-trimethyl-5 azathioxanthone hydrochloride (Ciba 17581) was used in the treatment of two Europeans and 23 Africans suffering from vesical or intestinal schistosomiasis. In adults, a total of 6.6 gm. of drug was given in two courses of treatment of seven and five days respectively and with a rest of five days between courses. It was concluded that in both types of infection the patients showed marked clinical improvement but that radical cures were obtained in a small percentage of cases only. It is considered that the drug is much better tolerated than lucanthone hydrochloride, has advantages in being used in oral treatment but leaves much to be desired when compared with treatment with antimonials. It is recommended that Ciba 17581 be used in supportive treatment between two courses of treatment with antimonials. O.D.S.

(524h) A study was made in the treatment of urinary schistosomiasis in 11 Africans and two Europeans with desoxybenzoin and of nine others with a classical course of antimony. Since toxic effects were largely absent, desoxybenzoin was given in two courses of eight to ten days with an eight-day interval; the prescribed dose was 10 to 15 tablets per day, each tablet of about 250 mg. [Details of dosage are not given clearly.] Follow-up observations were made for four to six months in most cases and up to one year in some. The drug was found to be well tolerated and treatment resulted in disappearance or amelioration of symptoms. However, little evidence was found of radical cure. It is considered that desoxybenzoin may have a place in supportive treatment between courses of antimonials. O.D.S.

(524i) The contraction of gravid segments of *Taenia saginata*, the beef tapeworm, passing out of the anus, causes the deposition of eggs and these may be detected by Graham's method, employing adhesive cellophane tape and originally devised for the detection of *Enterobius* eggs. This method is more effective in detecting *T. saginata* than is examination of the faeces. 3,000

children of various races were examined and 0.06% proved to be infected. In this forest region the incidence is lower than in the cattle-raising areas of Africa. From their findings, Doby *et al.* discuss the influence of race, age and sex on incidence and conclude that the differences they find may be related to differences in dietary habits, which are determined by religion, money, preference for rare meat and methods of preparation of the meat. J.M.

(524j) Doby & Fourcade, as a result of the examination of 3,000 native children in the region of Yaoundé (Cameroons), by the Graham swab technique, found that according to locality 17% to 63% of children of pre-school age (under three) suffered from ascariasis and 7% to 15% from trichuriasis. The corresponding figures for children of school age (three years and over) were 53% to 69% and 14% to 37%. The total figures for intestinal parasitism were 25% to 72% and 72% to 91% in the two groups. The infection rate in both cases increased with age and was slightly higher in boys than in girls. It is stressed that the technique used is only valid when primitive conditions of personal hygiene permit the collection of a film of faecal material from the peri-anal region by the swab; and that in view of the facts that a single examination only of each individual was made and that no concentration technique was used, these figures are minimal. The authors conclude that between 3 and 15 years of age the entire native population suffers from intestinal helminthiasis. J.M.W.

525—Bulletin de la Société Zoologique de France.

- a. DOLLFUS, R. P. & CHABAUD, A. G., 1957.—“Phénomènes de convergence chez les spirurides, en particulier dans les sous-familles Habronematinae Chitwood et Wehr 1932 et Schistorophinae L. Travassos 1918; leur importance pour une classification naturelle des spirurides (Nematoda).” **82** (1), 88-102.

(525a) Dollfus & Chabaud briefly discuss the classification of the spirurids and point out that the cuticular ornamentation, although easily observable, must be regarded with distrust in systematic work as comparable ornamentation may be found in diverse groups. They consider as retrograde the classification, proposed by Skryabin in 1941 and more especially by Sobolev in 1949, in which the acuariids are greatly subdivided, almost entirely on the basis of cuticular ornamentation. Chitwood & Wehr in 1934 classified the Acuariidae on the cuticular structures and this resulted in the inclusion in this family of genera which are clearly related to the habronemes. The authors modify slightly the scheme of Chitwood & Chitwood (1950) and define the position of the Acuariidae more precisely. The suborder Spirurina is divided into three superfamilies, the Physalopteroidea, the Spiruroidea and the Filarioidea, and the Spiruroidea into the four families Thelaziidae, Spiruridae, Tetrameridae and Acuariidae. The characters separating the Habronematinae (Spiruridae) from the Schistorophinae (Acuariidae) are clearly set out and the genera with head ornamentation (*Parabronema*, *Hadjelia*, *Histiocephalus* etc.) are removed from the latter. A table is given for the separation of those genera remaining in the Schistorophinae. *Skrjabinura* and *Seuratinema* are very closely related and *Skrjabinuridae* becomes a synonym of *Cucullanidae*. *Salobrellidae* is made a subfamily of *Spiruridae*. *Skrjabinochona* is a synonym of *Habronema* and *Skrjabinobronema* and *Parahistiocephalus* are synonymous with *Ancyracanthopsis*. *Stellocaronema* and *Stellobronema* are extremely close and possibly identical with *Hadjelia*. S.W.

526—Bulletin of the World Health Organization.

- a. KIRK, R., 1957.—“Factors in the pathogenesis of ocular onchocerciasis.” **16** (3), 485-493. [French summary p. 492.]
- b. RODGER, F. C., 1957.—“New observations on ocular onchocerciasis. Related pathological methods and the pathogenesis of the various eye lesions.” **16** (3), 495-508. [French summary p. 507.]
- c. DE MEILLON, B., 1957.—“Bionomics of the vectors of onchocerciasis in the Ethiopian geographical region.” **16** (3), 509-522. [French summary pp. 520-521.]
- d. ROMEO DE LEÓN, J., 1957.—“Simuliid vectors of onchocerciasis in Guatemala.” **16** (3), 523-529. [French summary pp. 528-529.]
- e. SATTI, M. H. & KIRK, R., 1957.—“Observations on the chemotherapy of onchocerciasis in Bahr el Ghazal Province, Sudan.” **16** (3), 531-540. [French summary pp. 539-540.]

- f. McMAHON, J. P., 1957.—“DDT-treatment of rivers for eradication of Simuliidae.” **16** (3), 541-551. [French summary p. 551.]
- g. RAGHAVAN, N. G. S., 1957.—“Epidemiology of filariasis in India.” **16** (3), 553-579. [French summary pp. 569-570.]
- h. HAWKING, F., 1957.—“The distribution of bancroftian filariasis in Africa.” **16** (3), 581-592. [French summary p. 592.]
- i. KIRK, R., 1957.—“Filariasis in the Sudan.” **16** (3), 593-599. [French summary pp. 598-599.]
- j. GALLIARD, H., 1957.—“Outbreak of filariasis (*Wuchereria malayi*) among French and North African servicemen in North Vietnam.” **16** (3), 601-608. [French summary p. 608.]
- k. CHOW, C. Y. & THEVASAGAYAM, E. S., 1957.—“Bionomics and control of *Culex pipiens fatigans* Wied. in Ceylon.” **16** (3), 609-632. [French summary p. 631.]
- l. KESSEL, J. F., 1957.—“An effective programme for the control of filariasis in Tahiti.” **16** (3), 633-664. [French summary pp. 662-663.]
- m. AUGUSTINE, D. L., 1957.—“The pathogenicity of *Onchocerca volvulus* in relation to lymphadenopathy and elephantiasis.” **16** (3), 665-669.
- n. FREEMAN, P., 1957.—“The problem of the *Simulium neavei* complex.” **16** (3), 669-670.
- o. LEWIS, D. J., 1957.—“Simuliidae and their relation to onchocerciasis in the Sudan.” **16** (3), 671-674.
- p. ZURETTI, S., 1957.—“Les simules et l'onchocercose en Somalie.” **16** (3), 674-676.
- q. DÍAZ A., F., 1957.—“Notes and observations on onchocerciasis in Guatemala.” **16** (3), 676-681.
- r. VARGAS, L. & TOVAR, J., 1957.—“Resistance of *Onchocerca volvulus* microfilariae to diethyl-carbamazine.” **16** (3), 682-683.
- s. ROMEO DE LEÓN, J., 1957.—“Evaluation of new onchocercidal drugs used in Guatemala.” **16** (3), 684-685.
- t. MATTINGLY, P. F., 1957.—“Notes on the taxonomy and bionomics of certain filariasis vectors.” **16** (3), 686-696.
- u. MAZZOTTI, L. & PALOMO, E., 1957.—“A note on the survival of the microfilariae of *Mansonella ozzardi*.” **16** (3), 696-699.
- v. ZULUETA, J. DE, 1957.—“Observations on filariasis in Sarawak and Brunei.” **16** (3), 699-705.

(526a) Kirk describes the discovery of *Onchocerca volvulus* and of onchocerciasis; and briefly reviews the history of their investigation. He stresses the importance of ophthalmic examination and emphasizes that clinical examination of the eye alone is insufficient, especially in areas, such as the Sudan, where eye diseases are common. The objective anterior and posterior manifestations of ocular onchocerciasis are succinctly described. Anterior manifestations are probably directly due to the presence of microfilariae in the tissues and media of the eye; but the bilateral nature of the posterior changes and the difficulty of demonstrating the worms in the posterior region of the eye are more suggestive of a toxic agent or vitamin deficiency. Hypersensitiveness is considered to be an improbable cause of the posterior manifestations. J.M.W.

(526b) Rodger records conclusions based on a study of the records of 2,000 blind or partially blind West Africans examined in onchocerciasis areas. Right and left conjunctival biopsies and at least 16 skin biopsies are stated to be minimal diagnostic requirements. Results of such biopsy examinations are given; and the distribution, types, incidence and evolution of nodules (onchocercomas) are described. The life span of *Onchocerca* adults is estimated at 10 to 15 years. The mechanism of ocular lesion production is discussed in the light of experiments on guinea-pigs and rabbits; and it is concluded that it is dead rather than living microfilariae which act as toxins, and that the reaction is primarily a toxic one. The evidence failed to support the allergic theory but the hypersensitive state which was lacking in the experimental animals may be produced in man. Clinical observations led to the conclusion that a relationship exists between posterior ocular lesions and vitamin A deficiency; and that punctate corneal opacities result more often from certain virus diseases and from malaria than from onchocerciasis. Keratitis and anterior uveitis—the common lesions—initiate a series of degenerative ocular conditions arising primarily from interference with the nutrition of the lens and cornea in combination with a diet deficient in vitamin A. J.M.W.

(526c) Of the two proved insect vectors of onchocerciasis in Africa, the more wide-spread and the easier to identify is *Simulium damnosum*. The identity of *S. neavei* is less easily established, and a summary of the present position regarding the *S. neavei* complex is given. Available information regarding the bionomics of the immature stages and adult females of

S. damnosum and *S. neavei* is discussed in detail. Special attention is given to the behaviour of the adults after hatching, their longevity, flight range, food, biting habits and seasonal variation in numbers; and to the nature of the breeding places. Consideration is also given to the relation between each species and the disease. Distribution maps are included. J.M.W.

(526d) Onchocerciasis in Guatemala is transmitted by *Simulium ochraceum*, *S. mooseri* and *S. callidum*. Of these, *S. ochraceum* is the principal vector because it is specifically anthrophilic and because it is more numerous in the areas of endemicity. Other potential vectors exist but have not been found harbouring developing forms of *Onchocerca*. Simuliidae are most prevalent in December and fewest in numbers during June, July and August. Average flight range was found to be about 7.5 miles but it is pointed out that the flies may be transported to greater distances while feeding on horses or mules. Metacyclic forms were found either free in the abdomen or, more frequently, lodged in the Malpighian tubules of Simuliidae dissected; but were not found in the cephalic region. J.M.W.

(526e) Satti & Kirk treated small numbers of cases of onchocerciasis in Bahr el Ghazal Province, Sudan, with varying dosage schedules of antypol, pentastam and hetrazan. Antypol was effective in producing disappearance of microfilariae and onchocercal nodules, and improvement in cases of defective vision with anterior manifestations; but its severe toxic side effects (which are described in detail), and the fact that out of 20 patients so treated four died, precluded its use. Pentastam was non-toxic but ineffective in the dosage tried. Hetrazan produced rapid disappearance of microfilariae, but this was accompanied by allergic reactions and there was no other indication of improvement. The authors conclude that the more actively filaricidal a drug is, the more toxic it will be to the patient. They stress that effective chemotherapy of onchocerciasis requires the devising of some method of avoiding allergic reactions. J.M.W.

(526f) McMahon describes methods of estimating the discharge of water in rivers and streams by means of weirs, current meters and floats; and gives details (choice of site, treatment cycle, calculation of dosage) of a dosing procedure for the eradication of Simuliidae from infested waters. J.M.W.

(526g) Raghavan reviews the history of filarial infections in India and discusses factors affecting the filariae, their vectors and the human reservoir of infection. Both *Wuchereria bancrofti* and *W. malayi* show nocturnal periodicity. The principal vector of *W. bancrofti* is *Culex fatigans*; *Anopheles philippinensis* and *A. stephensi* can also carry the infection; but no species of *Aedes* has been found infected. *Mansonia annulifera* and *M. uniformis* are the principal vectors of *W. malayi*. Age, race, sex and occupation are discussed in relation to the epidemiology of filariasis in India. Techniques for determining the degree of infection, disease and endemicity of filariasis in a community are described. Special attention is given to the staining, identification and enumeration of microfilariae; to the selection of persons to be examined; to the size of samples; and to the study of the vector. The effect of climate upon filariae, and the diagnosis of filariasis are discussed. Aspects requiring further study are indicated. Tables set forth the classification of filarial disease processes; the incidence in different age and sex groups; and characters in relation to degree of endemicity. In a series of annexes details are given of filarial surveys carried out in India; natural and experimental infections of Indian mosquitoes with *W. bancrofti* and *W. malayi*; some animal filarial infections in India and their vectors; a form for recording results of mosquito dissections; a *pro forma* for feeding experiments; and instructions on the making of a filaria survey. J.M.W.

(526h) Hawking reviews the literature on the distribution of bancroftian filariasis in Africa and adds data based on personal experience. He concludes that the disease is wide-spread in Africa in the region between the Sahara desert to the north and the Zambezi river to the south, and is also found in Egypt. It is most prevalent in hot, damp areas near the coasts, along the great rivers, and around the great lakes. *Anopheles gambiae* and *A. funestus* appear to be the principal insect vectors. *Culex fatigans* has been found to be a poor vector in most parts of Africa. Microfilarial and elephantiasis rates are given for the principal endemic areas; and much additional information (not available at the time of preparation of the main review) is given in an annexe. J.M.W.

(526i) Kirk summarizes the available information on *Loa loa*, *Acanthocheilonema perstans* and *Wuchereria bancrofti* infections in the Sudan, with special reference to the prevalence and distribution of the vectors. *L. loa* infection occurs in the region between 4° and 6°N. latitude and affects 20% of the indigenous population. *Chrysops silacea* is probably the principal vector. *A. perstans* is more widely distributed in the Sudan, but its vector there has not yet been determined. Clinical manifestations of bancroftian filariasis are not uncommon, particularly along the Abyssinian border, but *W. bancrofti* has been relatively rarely found except in the Kadugli area of the Nuba mountains. The vector mosquitoes have not yet been determined, although species known to transmit *W. bancrofti* elsewhere occur in the endemic areas. The necessity of further investigation is emphasized. J.M.W.

(526j) Galliard describes the investigation of an outbreak of filariasis due to *Wuchereria malayi* in about 150 servicemen returning to Algeria from Tonkin, North Viet Nam, in 1951. The symptoms and histopathology recorded are described and discussed. Four clinical forms were observed, namely, forms with adenopathy, eosinophilic forms, forms with bronchitis and forms with lymphangitis. Novarsenobenzol and hetrazan were used in treatment and both gave satisfactory results. The latter was the drug of choice. Many of the patients recovered spontaneously. The author concludes that severe, permanent and incurable lesions result only when constant reinfection takes place. He further suggests that, in addition to *W. malayi*, there exist in Viet Nam at least two biological races of *W. bancrofti* which are pathogenic for man. J.M.W.

(526k) *Culex pipiens fatigans* is the main if not the only vector of *Wuchereria bancrofti* in Ceylon. Periodic spraying with D.D.T. or BHC seems to have failed to achieve control. BHC water-dispersible powder and dieldrin dusts and granules at 0.1 lb. per acre gave the best results in the field but larvicides were essential also. Dieldrin and BHC in an oily solution, or water emulsion at 3 lb. to 4 lb. per acre gave satisfactory results if applied weekly. Residual spraying with either D.D.T. or BHC was still effective against *Anopheles culicifacies* (the malaria vector). W.K.D.

(526l) Kessel outlines the procedures which proved most successful and summarizes the results of filaria control in Tahiti. The effects of a control programme on primary filariasis may be apparent within one to two years but significant reductions in chronic filariasis may take much longer. The ordinary thick film is considered adequate for surveys. *Aedes polynesiensis* and *Culex quinquefasciatus* are the principal vectors; the former is the more important of the two. The adult *Aedes* have a limited dispersal range but breeding sites are numerous. The eggs show marked resistance to drying. Local control of the breeding sites with residual spraying was effective in reducing the vectors while notezine 6 mg. per kg. body-weight once a month for two years reduced 98% of the positives to negatives. One year later 39 out of 40 persons were still negative. W.K.D.

(526m) Although human onchocerciasis both in Africa and the Americas is considered to be due to *Onchocerca volvulus*, there are considerable differences in the pathogenicity of the disease in the two continents. An especial point is the lack of lymphoid reactions in the American disease. The need for further investigations in both continents is emphasized especially as regards the possible duality of *O. volvulus* and *O. caecutiens*. W.K.D.

(526n) *Simulium neavei* is the species responsible for the transmission of human onchocerciasis in the Kavirondo gulf area of Kenya. Subsequent research showed three species to be present, namely, *S. neavei*, *S. nyalalandicum*, and *S. woodi*. All live in association with river crabs but *S. neavei* is limited to a certain type of gallery forest. If *S. nyalalandicum* is really responsible for the disease in Tanganyika, the danger to Kenya is considerable. W.K.D.

(526o) In the Sudan three species of *Simulium*, namely, *S. damnosum*, *S. dentulosum* and *S. griseicollae*, bite man. The first-named is the principal vector but as *S. griseicollae* also occurs in some of the onchocerciasis areas it is also suspect. Because of the geographical and topographical difficulties radical control of the vectors is impracticable. W.K.D.

(526p) Zuretti made a 2,000-kilometre tour of Somalia, in the course of which intensive questioning of doctors, chiefs, villagers and others revealed no clinical case of onchocerciasis. *Simulium damnosum* was detected from one of the main townships even in the dry season so Zuretti suggests the advisability of further work on this question of the presence of the vector and the absence of the parasite.

W.K.D.

((526q) Guatemala has certain areas of hyperendemicity for onchocerciasis which are all in the most productive agricultural zones. Intestinal helminth infections are present in almost the whole adult rural population. For the treatment of onchocerciasis the use of both hetrazan and suramin is advised but those suffering from intestinal helminths should first be treated by vermifuges because of the danger of allergic reactions when the anti-filarial treatment begins. Díaz considers that not less than eight months elapse from the time of the simuliid bite to the formation of the onchocercoma.

W.K.D.

(526r) Of 50 patients suffering from onchocerciasis treated by diethylcarbamazine at the rate of four 50 mg. tablets daily for ten days, microfilariae were not entirely eliminated in 5% to 10%. Vargas & Tovar consider that the mass administration of hetrazan is unlikely to cure a sufficient number of carriers to be really effective and that there is a danger that the surviving microfilariae will be resistant specimens able, after passing through the insect vector, to produce resistant strains.

W.K.D.

(526s) Romeo de León reports on the use of hetrazan and suramin in onchocerciasis in Guatemala. The former appears to be the more effective microfilaricide but it is necessary to combine it with anti-filarial drugs. A modification of the basic formula of hetrazan might produce a more effective prophylactic drug. The toxicity of suramin is emphasized.

W.K.D.

(526t) Mattingly discusses the taxonomy of (i) the *Culex pipiens* complex and (ii) the bionomics of *Taeniorhynchus* (*Mansonioides*). The *C. pipiens* complex comprises seven forms, namely, the reproductively isolated species *C. pipiens* and *C. globocoxitus*; the reproductively compatible but geographically isolated subspecies *C.p. australicus* and *C.p. fatigans* (*C. quinquefasciatus*); and three forms of doubtful status *C.p. form molestus* (= *C.p. autogenicus*), *C.p. form pallens* and *C.p. form comitatus*. Through hybridization there appears to be a high degree of genetical plasticity and therefore of adaptability to varying environmental conditions. The complex includes vectors of filariasis and probably of the virus encephalitides. The control of the group is likely to be exceptionally difficult. The subgenus *Mansonioides* at present is a small group of nine species and though recognized as important vectors of *Wuchereria malayi* are of little or no importance in the case of *W. bancrofti*. In Africa the nocturnal rhythm shown by these mosquitoes in the Orient does not seem to have been recognized. There is a marked vertical distribution which is related to mating, and the latter to the ovarian cycle. The rhythmic activities in mosquitos may be governed by a "physiological clock" perhaps hormonal in nature.

W.K.D.

(526u) Mazzotti & Palomo studied three patients in Mexico whose blood contained the microfilariae of *Mansonella ozzardi*. Their bloods were inoculated into three other patients from a known non-filarial area whose blood did not contain microfilariae. The period of survival of the microfilariae appeared to bear some relation to the number injected. One of the inoculated patients died two years after the transfusion but in the survivors microfilariae of *M. ozzardi* were found for 33 and 26 months, respectively, after the transfusion. *M. ozzardi* microfilariae may possibly be more resistant than those of other species.

W.K.D.

(526v) During a malaria survey of Sarawak and Brunei in 1952-53 filariae were found in a number of the thick blood-films taken during the day-time, so that in view of the nocturnal periodicity of both *Wuchereria bancrofti* and *W. malayi* a number of cases must have passed unnoticed. The distribution of *W. malayi* in Sarawak is irregular. A focus of *W. bancrofti* was found in a remote corner of the interior. It is suggested that Malays are more liable to infection than the Chinese though the latter are much more predominantly urban residents. The vectors seem to be *Anopheles leucosphyrus* and *A. barbirostris*.

W.K.D.

527—Canadian Insect Pest Review.

- a. BAKER, A. D., 1957.—“Notes on some nematodes in Canada in 1956.” **35** (1), 120–122.
- b. ANON., 1957.—“Border interceptions.” **35** (2), 146–149.
- c. ANON., 1957.—“Records of nematode identifications, Canadian National Collection of Nematodes.” **35** (2), 150–156.
- d. ANON., 1957.—“Vegetable insects—nematodes.” **35** (4), 201.
- e. MULVEY, R. H., 1957.—“Nematodes.” **35** (6), 249.
- f. ANON., 1957.—“Border interceptions.” **35** (6), 267.
- g. ANON., 1957.—“Border interceptions.” **35** (7), 283–284.
- h. ANON., 1957.—“Occurrence of plant-parasitic and predaceous nematodes in soil and tree root samples from Ontario and Quebec.” **35** (7), 287–290.
- i. ANON., 1957.—“Bulb and stem nematode.” **35** (9), 313.

(527a) *Heterodera schachtii* var. *trifolii* was found on *Trifolium repens* L., *Vicia villosa* Roth. and *Phaseolus vulgaris* L. [This report repeats much of the information given in 1956 in *Canad. Ins. Pest Rev.*, **34** (2), 160–161 and **34** (9), 335–337.] D.J.H.

(527b) Fourteen named plant-parasitic nematodes were found in soil samples from France, Germany and Egypt. *Meloidogyne hapla* infested rose roots from Holland, Japan and Texas. *M. incognita* was found on gardenia and *M. incognita* var. *acrita* on privet. Soil about roots of roses from England contained several plant-parasitic nematodes. D.J.H.

(527c) Twenty plant-parasitic nematode species from various hosts and localities in Canada during 1956 and 1957 are recorded in tabular form. Included is a record of *Pratylenchus penetrans* severely infesting the crown of *Saintpaulia ionantha*. 17 named nematode species that are either parasites or associates of insects are also recorded. D.J.H.

(527d) Nematodes [not named] are recorded for the first time infesting commercial horticultural crops in a southern Alberta market garden. D.J.H.

(527e) A new record of *Heterodera avenae* associated with poor growing oat crops is reported from Ontario. *H. schachtii* also occurred in nearby fields. D.J.H.

(527f) Agave plants from Florida and *Lonicera* plants from Tennessee infested with *Meloidogyne incognita* were intercepted. The former were hot-water treated and released, the latter were destroyed. D.J.H.

(527g) Cysts of *Heterodera punctata* and other *Heterodera* spp. were obtained from soil in a package of perennials from England. D.J.H.

(527h) Twenty plant-parasitic nematode species and seven *Mononchus* spp. are recorded from roots and soil samples from 17 different kinds of trees. *Hemicycliophora*, *Rotylenchus* and *Paratylenchus* species were the most frequently encountered root parasites. Many of the records are new for Canada. D.J.H.

(527i) In the south-western Ontario onion-growing marshes 40 acres of onions were destroyed by *Ditylenchus dipsaci*. This is the first report of this pest for this area. D.J.H.

528—Ceylon Veterinary Journal.

- a. SHOHO, C. & KULASEGARAM, P., 1957.—“Kumri of horses in India. Pathological report of a case.” **5** (4), 76–80.
- b. SHOHO, C. & KULASEGARAM, P., 1957.—“Studies on cerebrospinal nematodiasis (I). Pathological studies of goats in Ceylon affected with cerebrospinal nematodiasis.” **5** (4), 81–84.

- c. SHOHO, C. & BALACHANDRAN, K., 1957.—“Studies of cerebrospinal nematodiasis in Ceylon (II). Observations on (1) stud-goats affected by cerebro-spinal nematodiasis and (2) she-goats with residual sign of ‘Thalai suladdal’ (turning at the neck) after treatment.” **5** (4), 85–87.

(528a) The pathological changes found at autopsy in the brain and spinal cord of an Indian horse that had suffered from kumri were similar to those described as occurring in horses so affected in Ceylon. They were presumably due to the same cause, namely, wandering immature individuals of *Setaria digitata*. J.M.W.

(528b) A goat suffering from weakness of the left hind quarter and swaying gait was killed and the brain and spinal cord examined histologically. The lesions found are described and figured. A worm recovered from the neighbourhood of one of the brain lesions was identified as an immature specimen of *Setaria digitata*. J.M.W.

(528c) Observations on a female goat cured of cerebro-spinal nematodiasis by treatment with caricide suggest that the condition known in Ceylon as “thalai suladdal” is a residual sign of this disease. Experiments with two male animals, likewise cured of cerebro-spinal nematodiasis by caricide treatment, showed that even when paraplegic after an attack stud goats may be successfully used both as donors of semen for artificial insemination and for natural service. J.M.W.

529—Chácaras e Quintais.

- a. LORDELLO, L. G. E., 1957.—“Galhas gigantes em raízes de *Clitoria ternatea*.” **96** (2), 200.

(529a) Lordello records the occurrence of large galls due to *Meloidogyne javanica* on the roots of *Clitoria ternatea* in Brazil. This plant should not be used as green manure in soil infested with *M. javanica* when susceptible crops are to follow. M.T.F.

530—Citrus Leaves.

- a. BAINES, R. C., SMALL, R. H., DEWOLFE, T. A., MARTIN, J. P. & STOLZY, L. H., 1957.—“Nematode and Phytophthora control by Vapam.” **37** (5), 6–8, 24, 32–33.

(530a) The citrus nematode, *Tylenchulus semi-penetrans*, was controlled by doses of 274 to 475 lb. of Vapam per acre applied in water added to large basins of soil. Addition of Vapam into soil by injection, sprinkler or in irrigation water did not control the nematode and fungus. On sandy loam or gravelly soil a Vapam dose of 400 lb. per acre applied by sprinkler gave control of the nematode but not the fungus. J.J.H.

531—Comptes Rendus des Séances de la Société de Biologie. Paris.

- a. DESCHIENS, R., BERTRAND, D. & MOLINARI, V., 1957.—“Capacité d’accumulation de certains métaux par les mollusques de la famille des Planorbidés.” **151** (7), 1356–1358.
b. ROBIN, Y., THOAI, N.-v. & ROCHE, J., 1957.—“Sur la présence d’arcanine chez la sangsue, *Hirudo medicinalis* L.” **151** (12), 2015–2017.

(531a) Specimens of *Planorbis glabratus* (*Australorbis glabratus*) and *Bulinus truncatus* were removed after 24–48 hours immersion in aquaria containing strongly ionized solutions of salts of zinc, copper, iron or lead. The soft parts of six snails of each species removed from each test aquarium and control aquarium were analysed for their metallic content and the results expressed as mg. metal per kg. dry weight of tissue. The increase in metallic content from the normal concentration was: zinc, 98.4–368; copper, 56–2,280; iron, 592–4,600; lead, 0.16–35. The amounts of metal absorbed produced near toxic effects with copper and zinc but practically none with iron and lead. These observations on the great absorption of copper and its fixation in the tissues of these molluscs offer an explanation of the well known molluscicidal effects of this metal. O.D.S.

532—Contributions from Boyce Thompson Institute for Plant Research.

- a. SCHULDT, P. H. & BLUESTONE, H., 1957.—“Nematicidal properties of 3,4-dichlorotetrahydrothiophene-1,1-dioxide (PRD).” **19** (1), 63-75.
- b. BURCHFIELD, H. P. & SCHULDT, P. H., 1957.—“Colorimetric method for the determination of 3,4-dichlorotetrahydrothiophene-1,1-dioxide (PRD).” **19** (1), 77-86.

(532a) The nematicidal value of 3,4-dichlorotetrahydrothiophene-1,1-dioxide (PRD) was investigated using four test methods: (i) degree of galling on tomato plants by root-knot eelworm, (ii) *in vitro* tests with *Panagrellus redivivus*, (iii) the treatment of infested soil in jars and (iv) influence on nematode populations in field plots. The nematicide was found to have a high activity in these tests, and the effect of dosage rate and concentration is discussed. PRD was found to be as effective as Vapam and Nemagon for reducing galls on tomato plants in green-house tests and more effective than Nemagon, Vapam and D-D mixture for reducing total nematode populations in the field. PRD is toxic to seeds and seedlings and it is therefore recommended as a pre-planting treatment. On the other hand, established tomato, tobacco and cotton plants tolerated PRD at nematicidal concentrations. H.R.W.

(532b) A colorimetric method for the determination of PRD is described. This enables the nematicide to be recovered from soil and its rate of breakdown determined. Similarly, the influence of water percolation in the soil on its downward movement can be studied, yielding data which enable application methods to be designed which would minimize injury to the germinating seeds. H.R.W.

533—Cornell Veterinarian.

- a. GÜRALP, N., KAVANAUGH, J. & BAKER, D., 1957.—“Some further evaluation of emetine therapy against sheep and goat lungworms.” **47** (4), 515-524.

(533a) Emetine hydrochloride has been shown to clear *Muellerius capillaris* from 75% of sheep and goats after two treatments with 0.15 ml. of a 1% solution for each pound of body-weight. It is ineffective against either *Protostrongylus rufescens* or *Dictyocaulus filaria*. A review of the toxicology of emetine hydrochloride is given. K.H.

534—Current Science. Bangalore.

- a. ALI, S. M., 1957.—“A note on a new nematode on *Chilotraca infuscatellus* from Sugarcane Research Institute, Pusa.” [Correspondence.] **26** (8), 258.

(534a) A specimen of *Mermis* sp. was obtained from the body-cavity of *Chilotraca infuscatellus*, the sugar-cane stem-borer of Bihar. J.B.G.

535—Deutsche Gesundheitswesen (Das).

- a. SÜ, H. & HELD, F., 1957.—“Über die Askariidose des Magen-Darm-Traktes in Vietnam” **12** (29), 885-888.

(535a) Hoang Sù & Held state that *Ascaris* infection is very wide-spread in man in Viet Nam and should always be considered as a possibility in undiagnosed disturbances of the gastro-intestinal tract. Although X-rays are not considered to be the best method of diagnosing *Ascaris* infection they can be very useful and the authors briefly describe eleven cases (illustrated with photographs) where this method was successfully employed. A.E.F.

536—Dissertation Abstracts.

- a. DEWHIRST, L. W., 1957.—“Some aspects of the ecology of endoparasites of beef cattle in Kansas.” **17** (7), 1628.
- b. EMERICK, R. J., 1957.—“I: The effect of trace minerals, dicalcium phosphate and phenothiazine on the resistance of grazing lambs to *Haemonchus contortus* infection. II: Studies of the effects of certain stress factors on the resistance of lambs to *Haemonchus contortus* infection.” **17** (8), 1655-1656.
- c. HSU, S. Y. LI, 1957.—“On the interstrain variations of *Schistosoma japonicum*.” **17** (9), 1986-1987.
- d. BEMRICK, W. J., 1957.—“Some effects of nutrition and physiological stress on the host parasite relationship between the lamb and its nematode parasite *Haemonchus contortus*.” **17** (9), 2091.
- e. CAMPBELL, W. C., 1957.—“*Fascioloides magna* (Trematoda) with special reference to the adult in relation to disease.” **17** (9), 2092.
- f. PISTEY, W. R., 1957.—“Studies on the mosquito transmission of *Dirofilaria tenuis* Chandler 1942.” **17** (10), 2128.
- g. GALLATI, W. W., 1957.—“Studies on the morphology, taxonomy, and life history of *Atrio-taenia* (*Ershovia*) *procyonis* (Chandler, 1942) Spasski, 1951 (Cestoda: Linstowiidae), a parasite of the raccoon, *Procyon lotor lotor*.” **17** (10), 2337.
- h. PEEBLES, C. R., 1957.—“An electron microscope study of *Rhabditis strongyloides* (Nematoda).” **17** (10), 2339.
- i. BOGITSH, B. J., 1957.—“Studies of helminths of fish from ponds in Albemarle County, Virginia.” **17** (11), 2385.
- j. OLSON, L. J., 1957.—“Studies on the resistance of white rats and cotton rats to infection with *Litomosoides carinii* (Travassos, 1919) Chandler, 1931.” **17** (11), 2574.
- k. COSTELLO, L. C., 1957.—“Studies on the aerobic metabolism of *Strongyloides papillosus* (Wedl, 1856) infective larvae.” **17** (11), 2710.
- l. TERHAAR, C. J., 1957.—“Carbon tetrachloride as an anthelmintic: its effect on and distribution in a parasite (*Ascaridia galli*) and its host.” **17** (11), 2720-2721.
- m. TURNER, J. H., 1957.—“Studies on the parasitic behavior of *Strongyloides papillosus* (Wedl, 1856) in sheep and goats.” **17** (11), 2721-2722.
- n. DURRANI, M. Z., 1957.—“A study on the physiology of *Ascaris suis* and *Parascaris equorum*.” **17** (12), 2983.
- o. BURNHAM, K. D., 1957.—“An investigation with the electron microscope of the acanthor of *Macracanthorhynchus hirudinaceus*.” **17** (12), 3131.
- p. DUNN, M. C., 1957.—“Studies on the germ cell cycle of *Neorenfier wardi* (Byrd, 1936).” **17** (12), 3132.
- q. RUNDELL, H. L., 1957.—“Electron microscope studies of the body covering of cestodes.” **17** (12), 3138.

(536a) Weekly counts of helminth eggs per gramme in faeces of beef cattle from the Flint Hills region of Kansas were fairly low in spring-born calves until the first winter. They reached a peak in the following spring with the increasing soil temperatures and thereafter dropped sharply. The parasites which were most numerous and contributed to the spring rise were the *Cooperia-Ostertagia-Trichostrongylus* group, the *Haemonchus-Oesophagostomum* group and *Nematodirus*. The numbers of *Bunostomum*, *Trichuris* and *Moniezia* were low throughout the year. In a faecal sample one egg represented 1.3 worms of the *Haemonchus-Oesophagostomum* group while 210 *Nematodirus* worms were represented by one egg. Egg production per female worm was modified by the age of the host, the season of the year and the number of parasites present. Lowered incidence resulted from the use of (i) a nutritious diet, (ii) supplemental winter feeding in feed racks, (iii) clean water in tanks, (iv) summer fallowing of a winter feed lot or pasture and (v) yearly alternation of summer pasture.

R.T.L.

(536b) The average data obtained from experiments, covering a period of four years, in which lambs experimentally infected with 20,000 third-stage larvae of *Haemonchus* and given free access to various mineral and phenothiazine supplements, indicated that dicalcium phosphate and phenothiazine with mineralized salt were similarly effective in protecting the lambs against stomach worms, especially when given together in the same ration. In studies on the effects of stress factors it was shown that lambs with a previous *Haemonchus* infection or phlebotomy had a higher resistance to the effects of subsequent infection, while the imposition of metabolic stress by feeding iodinated casein did not affect the degree of resistance to subsequent stomach worm infection.

R.T.L.

(536c) By infecting laboratory animals with *Schistosoma japonicum* cercariae from oncomelanian snails from the Chinese mainland, Japan, Formosa and the Philippines, Hsü is led to the conclusion that each of these four geographical strains has now developed its own characteristics in the length of adult body, the morphology of the male sexual glands, the size and shape of the eggs and the duration of the prepatent period. But one or other of these characteristics may be shared by one strain with another.

R.T.L.

(536d) The protection given under field conditions to lambs experimentally infected with 20,000 *Haemonchus contortus* larvae each by a trace mineral salt mixture containing 10% phenothiazine and one containing 25% dicalcium phosphate was the same as judged by egg counts, haemoglobin values, carcass grade and total worm counts, but lambs which received both preparations appeared to do slightly better. After being bled by jugular puncture, fed with iodinated casein, or after a previous infection with *H. contortus*, lambs were able to resist challenge with a heavy dose of infective larvae as compared with untreated controls, although those receiving iodinated casein in sufficient quantity to upset their metabolism were more susceptible to the effects of the challenge infection.

R.T.L.

(536e) Miracidial penetration of the molluscan host of *Fascioloides magna* is governed by chemotactic response and is not the result of random contact. The outer cyst of the metacercaria is tanned similarly to the egg-shell. In sheep the flukes are not usually encapsulated but in deer and cattle they are invariably enclosed in fibrous capsules in the liver. The associated pigment is haematin not melanin. The infection is often lethal to sheep but is tolerated by deer.

R.T.L.

(536g) Gallati found 22 out of 29 raccoons (*Procyon lotor lotor*) from the Ohio area, U.S.A., to be infected with *Atriotaenia* (*Ershovia*) *procyonis* (Chandler, 1942) Spasski, 1951; some of them heavily. The life-history of this tapeworm was completed experimentally in the laboratory, using the flour beetle, *Tribolium castaneum*, as intermediate host and the raccoon as definitive host; and was found to parallel those of other known linstowid tapeworms. Ten-day-old cysticeroids were mature and infective to the raccoon, while gravid proglottides were passed by a previously uninfected raccoon 12 days after it had been fed such cysticeroids. Most organs in the adult worms were found to be larger than the corresponding organs in Chandler's type.

J.M.W.

(536h) Study of ultra-thin sections of *Rhabditis strongyloides* with the electron microscope revealed previously undescribed structures in the cuticular layers of adult and larval worms, the hypodermis, the muscle cells, the intestinal wall, the nerve cord and the excretory sinus. The nematodes were fixed in 1% osmium tetroxide containing 1% magnesium chloride buffered to pH 8.2.

J.M.W.

(536i) Examination of approximately 1,000 fish from ten ponds in Albemarle County, Virginia, revealed seven species of trematodes, three species of cestodes, one species of acanthocephalan and six species of nematodes. [No names of hosts or parasites are given.] *Tetracotyle lepomensis* n.sp. has been described for the first time. *Bothriocephalus cuspidatus* alone showed marked seasonal variation in incidence. The fish were not debilitated as a result of parasitic infection.

J.M.W.

(536j) Mature (one-year-old) cotton-rats were significantly less resistant than white rats of similar age to subcutaneous infection with larvae of *Litomosoides carinii*. Infective larvae allowed to initiate development in cotton-rats and then transferred to the abdominal cavity of white rats at first developed as well as in the cotton-rat but later produced fewer microfilariae and were more frequently encapsulated by host inflammatory cells. Passage of microfilariae

from white rats through the mite vector did not produce increased adaptation for survival in this host. No difference in resistance was observed between immature rats of the two species, or between immature and mature cotton-rats; but white rats eight or more weeks old showed age resistance. Immunization of white rats resulted in decreased percentages of larvae completing migration and in increased encapsulation of those reaching the peritoneal cavity. Cortisone injections did not affect the percentages of larvae completing migration but suppressed cellular response and encapsulation in unimmunized rats and acquired resistance in immunized animals.

J.M.W.

(536k) Costello investigated the aerobic metabolism of infective filariform larvae of *Strongyloides papillosus* and found that their QO_2 was 28.5. The larvae were unable to survive in the absence of oxygen and apparently utilized the aerobic metabolism of fatty materials as their main source of energy. Both a cytochrome system and a Krebs cycle appeared to be present. A possible inverse relationship between the QO_2 and the longevity of nematode larvae was presented.

J.M.W.

(536l) Chickens infected with *Ascaridia galli* were treated with C^{14} -labelled carbon tetrachloride. Radio-active tracer analysis showed that the parasites had relatively greater uptake of the drug than did any of the host's tissues. Analytical infra-red and colorimetric methods of analysis were not successful in determining trace amounts of carbon tetrachloride in the tissues. Most of the drug was apparently excreted by the lungs but C^{14} was also found in the stools. The treatment did not affect the weight gains of the host birds.

J.M.W.

(536m) Lambs and kids exposed to single cutaneous applications of infective *Strongyloides papillosus* larvae in dosages of 100,000 or over died 13 to 41 days following infection, after showing anorexia, weight loss, diuresis, lassitude, anaemia and mushy to fluid stools. Pathological changes occurring in the lungs, duodenum and jejunum of infected animals are described. The migration route of the larvae through the host body was found to be similar to that of other *Strongyloides* spp. Immunizing infections were induced in lambs and kids by cutaneous application of 10,000, 20,000 or 30,000 larvae at two-day intervals for 20 days, or by single cutaneous exposures to 30,000 larvae. Immunized animals showed little effect when exposed to cutaneous application of 300,000 larvae, normally a lethal dose; but two out of three control animals died. Immunity was not transferable by injections of immune serum, nor could it be stimulated by injections of larval homogenates. Pre-natal infection was not observed. Age resistance had not developed in nine-month-old hosts.

J.M.W.

(536n) Durrani reports the results of a study of the physiology of the digestive system and oxidative metabolism of *Ascaris suum* and *Parascaris equorum*. Amylolytic, lipolytic and proteolytic enzymes were extracted from the intestines of both species and their relative activity and optimal pH levels determined. The oxygen uptake per hour of the whole worm was higher in the case of *P. equorum*, whereas the oxygen uptake of muscle pulp did not differ significantly in the two species. The hourly oxygen uptake of 1,000 mature eggs of *A. suum* differed little from that of 1 gm. wet weight of the whole worm.

J.M.W.

(536o) Burnham re-investigated the enveloping structures surrounding the acanthor of *Macracanthorhynchus hirudinaceus* using the electron microscope. The thick shell was found to be composed of three layers, namely, an outer zone composed of dark bodies of differing lengths and shapes and a dense band-like inner zone, joined by a central meshwork of thick filaments continuous with both outer and inner layers. A thin membrane was adherent to the shell externally, while the fertilization membrane and a thin innermost membrane separated the embryo from the shell internally.

J.M.W.

(536p) Dunn describes the life-cycle of *Neorenilifer wardi*. The miracidium is liberated in the intestine of *Physa gyrina*, penetrates the gut wall and becomes a sacculated mother sporocyst; this gives rise to daughter sporocysts which produce cercariae; these leave the snail and penetrate into various species of frog tadpoles where they encyst. When eaten by snakes the metacercaria excysts in the small intestine and may remain there as long as four weeks. The mature flukes are found in the upper oesophagus and oral cavity. The diploid number of chromosomes is 22, reduction divisions taking place during gametogenesis. Each primary spermatogonium gives rise to 32 spermatozoa; the ovum leaves the ovary before the maturation division and, after penetration by a spermatozoon, two polar bodies are extruded before the male and female pronuclei fuse. Cleavage is unequal, the larger cell giving rise to the somatic tissue of the miracidium and the smaller to the germinal cells. Each germinal cell ultimately divides unequally, the larger cell forming the somatic tissue of the next generation and the smaller, the germinal cells. S.W.

(536q) Rundell investigated the body covering of six species of cestodes (*Hymenolepis nana*, *H. microcirrosa*, *Moniezia expansa*, *Mesocostoides latus*, *Cittotaenia punctata-americana*, *Corallobothrium giganteum*) by means of the electron microscope. The structure was essentially the same in all the species studied and at all locations on the strobila. It consisted of two layers only—a thick heterogeneous outer cuticular layer and a thin structureless subcuticular membrane—and not of three or more layers as described by previous investigators. Minute, hollow, villus-like structures (comidia) projecting from the surface of the cuticular layer increase the surface area $11\frac{1}{2}$ times and may assist in preventing expulsion by peristalsis. J.M.W.

537—Euphytica. Wageningen.

- a. COLE, C. S. & HOWARD, H. W., 1957.—“The genetics of resistance to potato root eelworm of *Solanum tuberosum* subsp. *andigenum*, clone C.P.C.1690.” **6** (3), 242–246. [Dutch summary pp. 245–246.]

(537a) Resistance to *Heterodera rostochiensis* in *Solanum tuberosum* subsp. *andigenum*, clone C.P.C. 1690, and in various crosses derived from this clone is due to a single dominant factor, as previously found for clones C.P.C. 1673 and C.P.C. 1685 (Huijsman, 1955) [for abstract see Helm. Abs., **24**, No. 228a]. That all three clones may contain the same factor is suggested by similarities in diffusate activity, larval invasion and subsequent larval development found by other workers [for abstracts see Helm. Abs., **25**, No. 117b; **26**, No. 267b]. Preliminary results for clone C.P.C. 1692 suggest that resistance here is not due to a single dominant factor. R.D.W.

538—Extension Circular. North Carolina State College of Agriculture.

- a. TODD, F. A. & BENNETT, R. R., 1957.—“Cropping systems for nematode control and tobacco production.” No. 409, 16 pp.

(538a) The authors discuss the three nematodes most prevalent on tobacco, root-knot, meadow and stunt nematodes, and suggest cropping systems, using plants resistant to some or all of these nematodes between tobacco crops. They point out that a three-year rotation is more effective than a two-year, and give numerous alternatives for both two, three and four-year rotations. There are also sections on rotation management and crop characteristics, the effect of the cropping system on fertilization practices, the effect of crop residues on the tobacco crop, and finally the additional control measures of soil fumigation and autumn cultural practices. A.M.S.

539—FAO Plant Protection Bulletin. Rome.

- a. MILLER, P. R., 1957.—“Plant disease situation in the United States: summer dwarf nematode disease of strawberry in Arkansas.” **5** (11), 174–175.

(539a) This is an account of summer dwarf of strawberries due to *Aphelenchoides besseyi* in Arkansas since 1954, based on the paper by Slack *et al.* [for abstract see Helm. Abs., **26**, No. 132a]. M.T.F.

540—Hawaii Farm Science.

- a. ISHII, M., 1957.—“Nematodes infesting roots of orchids.” **6** (2), 10.

(540a) Over 500 samples of soil and orchid roots from five genera were collected from eight localities in Hawaii. Neither burrowing nematodes, *Radopholus similis*, nor root lesion nematodes were found, but some spiral and pin nematodes were found in roots of a few orchid genera. Except for *Aphelenchoides besseyi* on *Vanda*, nematodes are generally of little economic importance in orchid culture. However, quarantine regulations in relation to the transmission of root nematode diseases sometimes seriously restrict the sale of plants. The usual nematocidal treatments are likely to damage orchid plants; hot-water treatment of infested stock plants, although retarding growth, and sanitary cultural methods are therefore recommended. C.C.D.

541—Horticultura. Copenhagen.

- a. LINDHARDT, K., 1957.—“Staengelålen (*Ditylenchus dipsaci*) i havebruget.” **11** (8), 123–127.

(541a) In recent years *Ditylenchus dipsaci* has become of increasing importance in Denmark as a parasite of garden flowers and vegetables. Lindhardt describes the parasite and gives a brief account of the symptoms of infection in cucumber, beans, carrots, strawberries, potatoes, parsnips, rhubarb, beetroot, celeriac, onions, peas, Hortensia, hyacinths, pinks, phlox, primula and tulips. Many common weeds can act as reservoir hosts. Infected soil should not be used for susceptible plants for at least three to four years. A.E.F.

542—Indian Journal of Helminthology.

- a. SUBHAPRADHA, C. K., 1957.—“Cestode parasites of fishes of Madras coast.” **7** (2), 41–132.
 b. ALI, S. M., 1957.—“Studies on the nematode parasites of fishes and birds found in Hyderabad State.” **8** (1), 1–83.

(542a) Forty-five cestode species, of which 20 are new, are succinctly described and figured from the spiral valve of marine fishes caught off the coast of Madras. *Anteropora indica* n.g., n.sp. a monozootic cestode 1–12 mm. in length, from the spiral valve of *Narcine timlei* is placed in a new family Monoporophyaetidae which, with Biporophyllaeidae, forms a new order Anteroporidae, replacing Subramaniam's Biporophyllidae, 1939 which is considered an unsuitable name as *Anteropora* has only one common uterine and genital pore. *Eulacistorhynchus chiloscyllius* n.g., n.sp. from *Chiloscyllium griseum* is placed in a new subfamily Eulacistorhynchinae of Lacistorhynchidae Guiart. Although it is close to Lacistorhynchinae it has a double chainette and the various parts of the scolex differ in relative length. *Otobothrium minutum* n.sp. from *Carcharias walbeehmi* and *C. limbatus* measures only 2.5 mm. in length whereas *O. penetrans* is 130 to 160 mm. and *O. insigne* 10 mm. As in *O. penetrans* there is no collar, the ciliated pits are very small and the genital pore lies below the middle of the lateral margin, but the testes do not extend below the cirrus pouch. In *O. insigne* a collar is present, the ciliated pits are large and the genital pore is above the middle of the lateral margin. *Uncibilocularis indica* n.sp. from *Chiloscyllium griseum* is 16 mm. in length. The two loculi of the bothria are small and occupy only the posterior third of the bothria. Each bothridium has an accessory sucker, there is a tubercle on the outer prong of the hooks, the genital apertures alternate irregularly in or a little above the middle of the lateral margin; the testes number 50 to 60. *Acanthobothrium indicum* n.sp. from *Narcine braunii*, *A. southwelli* n.sp. from *Rhinobatus schlegelii*, *A. rhynchobatidis* n.sp. from *Rhynchobatus djiddensis* (divided into two subspecies named *A. r. elongatum* and *A. r. rotundum*) are also described and figured. The characters which differentiate these three new species from nine known species of *Acanthobothrium* are set out in tabular form. *Pithophorus musculosus* n.sp. from *Carcharias acutus*, *C. limbatus*, *C. walbeehmi* and *Rhynchobatus djiddensis* measures only up to 12 mm. in length. There are spines on the head, muscular pads bound the anterior opening, the genital pore is on the anterior third of the lateral margin and the cirrus is not spiny. In these respects it differs from *P. tetraglobus* and *P. vulpeculae*. *Echenei-*

bothrium verticillatum n.sp. from *Rhynchobatus djiddensis* differs chiefly from *E. oligotesticularis* in having 12 to 14 instead of four to seven testes, and from *E. flexile* in having bothria which are pediceled and each divided into two halves. *Echeneibothrium filamentosum* n.sp. from *Rhinobatus granulatus* and *R. schlegelii* measures only 0.7 to 1.417 mm. in length when fully mature. The genital organs are arranged as in *E. flexile* but the ovary is not divided into follicles. There are five testes, the irregularly alternating genital pores open in front of the middle of the lateral margin. The bothria are made up of two hinged halves and each half is divided into four loculi by transverse septa. *Carpobothrium megaphallum* n.sp. from *Chiloscyllium griseum* differs from *Carpobothrium chiloscyllii*, the only other species of this genus, in the absence from the scolex of two distinct flaps while the testes, numbering about 58, lie in front of the cirrus pouch and the shell gland is behind the ovary. The cirrus pouch is U-shaped, large and armed with spines. *Phyllobothrium typicum* n.sp. from *Carcharias acutus*, *C. walbeehmi* and *Mustelus manazo* is 3.68 mm. in length, the testes number 50 to 60 and the cirrus is unarmed. In these respects it differs from *P. prionacis*. *Phyllobothrium chiloscyllii* n.sp. from *Chiloscyllium griseum*, *Rhynchobatus djiddensis*, *Rhinobatus granulatus* and *R. schlegelii* has the genital pore anterior in position and measures only 12 mm. long, differing from *P. foliatum*, while in *P. centrurum* the genital pore is in the posterior half of the segment and the testes do not extend behind the cirrus pouch. *Phyllobothrium minimum* n.sp. from *Rhynchobatus djiddensis* is 2 mm. in length and consists of four or five segments. It differs from *P. chiloscyllii* in that the 39 to 57 testes are in two rows along the middle of the segment and the vitellaria do not extend behind the ovary. *Anthobothrium septatum* n.sp. from *Rhynchobatus djiddensis* and *Trygon imbricata* is up to 3 mm. in length with four to six segments and is peculiar in having transverse septa, which number ten to 15, dividing the bothria. *Anthobothrium crenulatum* n.sp. from *Rhinobatus helavi* strikingly resembles *A. septatum* but the bothria lack distinct septa and the segments number 15 to 16, while there are only 16 to 21 testes. It differs from *A. oligorchidum* in the absence of neck and in the number of testes. *Anthobothrium spinosum* n.sp. from *Carcharias acutus*, *C. walbeehmi* and *C. limbatus* is up to 4 mm. in length and differs from all other species of the genus in the presence of minute spines on the minute scolex. These spines also extend over the neck and anterior part of the strobila. *Cephalobothrium rhinobatidis* n.sp. from *Rhinobatus granulatus* measures up to 64 mm. in length. As there are only five oval testes in all the segments it is considered distinct from *C. abruptum* and *C. variabile* while its length differentiates it from *C. aetobatidis* which is only 10 mm. long. A table compares the characters of *Tylocephalum elongatum* n.sp. and *T. minimum* n.sp. from *Rhynchobatus djiddensis* with those of *T. dierama*. *T. elongatum* is 95 mm. long, a neck is absent and there is a long spiny cirrus. *T. minimum* is only 1 mm. to 2 mm. long and the 33 oval testes lie along the median longitudinal axis. In both of the new species the genital pore is distinctly anterior, it is below or in the middle of the segment and the vitellaria extend below the ovary.

R.T.L.

(542b) This Ph.D. Thesis consists of four parts: In Part I the systematics of the Camallanidae are discussed and, on the basis of a critical study of the species of *Procamallanus*, Ali divides this genus into three subgenera, viz., *Monospiculus* for those species with one spicule, *Isospiculus* for those with two equal spicules and *Procamallanus* for those with two unequal spicules. Of the six species collected by Ali from fishes in Hyderabad State, *Procamallanus* (*P.*) *heteropneustus* n.sp. came from *Heteropneustes fossilis*, *P.* (*P.*) *clarius* n.sp. from *Clarias batrachus*, *P.* (*P.*) *singhi* n.sp. from *Callichrous bimaculatus*, *P.* (*P.*) *hyderabadensis* n.sp. from *Mystus seenghala*, *P.* (*P.*) *viviparus* n.sp. from *Mystus microphthalmus* and *P.* (*P.*) sp. from *Ophicephalus gachua*. The key to the species of the genus published by Annereaux in 1946 is emended to permit the distribution of the new and known species among the three new subgenera. For a camallanid recovered from the fish *Ophicephalus punctatus* a new genus *Neocamallanus* is erected and the worm is named *N. singhi* n.g., n.sp. The chitinous tridents or rods present in the buccal capsule of *Camallanus* and *Camallanides* are absent in *Neocamallanus*. The family Cucullanidae is briefly reviewed and a key is given for the separation of the genera *Cucullamus*, *Dichelyne*, *Cucullanellus*, *Neocucullanellus* and a new genus *Indocucullanus* formed to contain *I. jaiswali* n.g., n.sp. from the edible fish *Barbus sarana*.

Indocucullamus is closely related to *Neocucullanellus* but lacks an intestinal diverticulum and chitinous plates in the pseudobuccal capsule, there are only five pairs of sessile papillae, the spicules are equal, there is a V-shaped gubernaculum and the tail lacks the horn-like process characteristic of *Neocucullanellus*. In Part II the systematic position of *Spinitectus* is discussed and its transference by Yorke & Maplestone from Rictulariidae to Thelaziidae is considered to have been justified. The seventeen known species of *Spinitectus* are listed and four new are added, viz., *S. thapari* n.sp. from *Notopterus notopterus*, *S. armatus* n.sp. from *Mystus tengara*, *S. singhi* n.sp. from the eel *Mastacembelus armatus* and *S. longipapillatus* n.sp. from *Rita hastata*. The hitherto unknown male of *S. corti* Moorthy is described. These new species are included in a key to the species of *Spinitectus* which is, however, incomplete as accounts of *S. cristatus* and *S. guntheri* were not available and the males of *S. asperus*, *S. mogurndae* and *S. plectroplites* are still unknown. Part II also contains a list of the 32 known species of *Rhabdochona* and a description of *R. singhi* n.sp. from *Glossogobius giuris*. The egg of this new species bears three cuticular projections which distinguish it from those of all known members of the genus. Parts III and IV describe several new nematodes from Hyderabad birds, viz., *Desmidocercella singhi* n.sp. from *Demigretta asha*, *Skrjabinocara buckleyi* n.sp. from *Phalacrocorax niger*, *Torquatella longiovata* n.sp. from *Merops orientalis*, *Viguiera leiperi* n.sp. from *Tchitrea paradisi*, *Paronchocerca mirzae* n.sp. from *Centropus sinensis*, *Aproctoides papillatus* n.sp. from *Francolinus pictus*, *Chandlerella singhi* n.sp. from *Caprimulgus* sp. and *Buckleyfilaria skrabini* n.sp. from *Orioles orioles*. *Torquatella torquata* (Gendre, 1922) and *Chandlerella sinensis* Hsi-chieh Li, 1933 are reported from India for the first time. R.T.L.

543—Informe Mensual. Estación Experimental Agrícola de "La Molina".

- a. DOMINGO MÉNDEZ R., E., 1957.—"Selecciones de algodón Tangüis y nematodos: campaña 1955-56." **31** (355), 10-15.

(543a) Damage to cotton by nematodes of the Heteroderinae, which is generally associated in Peru with light, infertile soils, has been observed mainly in the Pisco and Chincha valleys and is becoming worse owing to the monoculture of cotton. To control these nematodes Domingo Méndez recommends rotation with lucerne, wheat, maize and sorghum, fertilization of the soil and, if necessary, the leaving of the land fallow for two or three years. The application of heat or chemicals to the soil as control measures should be subject to economic considerations. In the experiment described in this paper, the nematode infestation was low and variations in cotton yields were due more to climatic conditions and infestation by *Verticillium albo atrum* than to nematode infection. M.McK.

544—Japanese Journal of Applied Entomology and Zoology.

- a. SAIGUSA, T., 1957.—[On the egg development and its morphological observation of the root-knot nematode, *Meloidogyne* spp.] **1** (4), 238-243. [In Japanese: English summary p. 243.]

(544a) Saigusa describes the eggs of *Meloidogyne hapla*, *M. incognita* var. *acrita* and a species close to *M. javanica*. On a suitable host *M. incognita* var. *acrita* produced 700-800 eggs per egg sac and *M. hapla* 550-650. The eggs of *M. hapla* are smaller than those of the other two species examined and have a smaller length:width ratio. M.T.F.

545—Japanese Journal of Medical Science and Biology.

- a. ITO, J., 1957.—"Studies on the brackish water cercariae in Japan. III. Three new echinostome cercariae in Tokyo Bay, with a list of Japanese echinostome cercariae (Trematoda)." **10** (6), 439-453.
b. KOMIYA, Y., 1957.—"A recommendatory note for the control problem of schistosomiasis in China." **10** (6), 461-471.

(545a) Ito describes five species of echinostome cercariae, three of which are new. They are *Cercaria ophthalmoechinata* n.sp., *C. pseudogranifera* n.sp. and *C. yamagutii* n.sp., all three found in *Tympanotonus microptera*, and the second and third also in *Cerithidea largillierii* and *C. cingulata*. The definitive hosts and adult worms remain unknown or

unrecognized. The author then tabulates the echinostome cercariae which have been recorded in Japan to date. *Cercaria pseudogranifera* closely resembles *C. granifera* Ogata, 1943 but differs from that form in that the latter species has 28 collar spines each 22μ to 25μ long, whereas the new species has not less than 36 spines which are very poorly developed. Further, *C. pseudogranifera* differs from *C. granifera* in the presence of a holdfast organ at the end of the tail; the absence of concretions in the ascending ramus of the excretory tube; and in the larger size. *C. ophthalmoechinata* differs from all other echinostome cercariae in the possession of eye spots. *C. yamagutii* resembles the cercaria of *Acanthoparyphium* sp. reported by Yamaguti in 1934, but differs from it in the identity of the snail host, locality and internal features. P.K.

(545b) This note on the control of schistosomiasis in China is made by a Japanese delegation of parasitologists following their survey of several endemic areas in China. These areas are distributed over 12 provinces. In general the organization of control is adequate although prophylaxis is less emphasized. The number of medical practitioners is insufficient and treatment restricted to symptomatic cases. Potassium antimony tartrate should be replaced by the equally effective and less toxic sodium salt. A short term treatment must be introduced in view of the large number requiring it. Control of snail vectors is recommended in preference to that of nightsoil, because of the deep-rooted habits of the population. The snails are found on the soil surface of the banks of almost all creeks, ditches and ponds. Several methods of eradication are at present under investigation or in the primary stages of application. In the Kiangsu Province calcium arsenite and benzene hexachloride are effectively used and are suitable as they do not contaminate the water, but chemical control must be uninterrupted to be effective. The delegation recommends fundamental environmental control, such as burying snails, development of marshy land and cementing ditches; the last is expensive but has proved extremely effective in Japan, and will pay where it can be combined with agricultural irrigation or fishery development work. G.I.P.

546—Journal of the American Medical Association.

- a. CHASE, G. O., 1957.—“Death due to eosinophilic myocarditis related to trichinosis. Report of a case.” **165** (14), 1826–1829.

547—Journal of Biological Chemistry.

- a. SAZ, H. J. & HUBBARD, J. A., 1957.—“The oxidative decarboxylation of malate by *Ascaris lumbricoides*.” **225** (2), 921–933.

(547a) Saz & Hubbard have isolated a “malic” enzyme (free of oxalacetic acid decarboxylase and lactic dehydrogenase), from the muscle of *Ascaris lumbricoides*. The enzyme differs from previously reported systems because (i) it did not catalyse the decarboxylation of oxalacetic acid regardless of the pH and the presence or absence of adenosine triphosphate, and (ii) it reacted with co-enzyme I as well as co-enzyme II. W.P.R.

548—Journal of the Department of Agriculture. South Australia.

- a. COOPER, C. M., 1957.—“Soil fumigation for control of nematodes.” **61** (3), 126, 129.

(548a) Practical recommendations are given for fumigation with ethylene dibromide of soil infested with root-knot nematodes. H.R.W.

549—Journal of Economic Entomology.

- a. BIRCHFIELD, W., 1957.—“The burrowing nema situation in Florida.” **50** (5), 562–564.

(549a) A summary of information on the burrowing nematode *Radopholus similis* (Thorne) is given. The taxonomy, life-cycle, pathogenicity, mode of spread, host plants, geographical distribution, economic importance and research and control of this nematode are reviewed. H.R.W.

550—Journal of the Egyptian Public Health Association.

- a. SALEM, H. H., FRIEDHEIM, E. A. H. & EL SHERIF, A. F., 1957.—“The treatment of schistosomiasis by antimony dimercaptosuccinate (TWSb).” **32** (7/8), 313–336.

(550a) TWSb (antimony dimercaptosuccinate) was given to 163 cases of urinary schistosomiasis and 20 cases of intestinal schistosomiasis. The drug was used as a 10% solution and the dose for adults was gradually increased until 4.0 ml. was given daily for five days either intravenously or intramuscularly. The recommended dose for children ranged from 10.5 ml. to 15.5 ml. over five days according to body-weight. More than 90% of cases were negative for viable ova after one month and of those examined after one year 96% were negative. The drug was well tolerated; side effects were present in about 20% of cases and included anorexia, vomiting, headache, insomnia, joint pains, abdominal colic and skin reactions.

O.D.S.

551—Journal of the Indian Medical Association.

- a. CHITKARA, N. L., 1957.—“Hydatid cyst as a cause of paraplegia.” **28** (12), 520.

552—Journal of Infectious Diseases.

- a. LEE, C. L. & LEWERT, R. M., 1957.—“Studies on the presence of mucopolysaccharidase in penetrating helminth larvae.” **101** (3), 287–294.

(552a) Lee & Lewert tested extracts of larvae of *Schistosoma mansoni*, *Strongyloides ratti*, *Ancylostoma caninum* and *Nippostrongylus muris* for mucopolysaccharidase activity against streptococcal capsules and the specific substrates, hyaluronic acid, chondroitin sulphuric acid, heparin and ovomucin. All extracts altered the streptococcal capsules though the extract of *Schistosoma mansoni* was the only one which had more than a slight effect. Of the other tests the only positive result was obtained with heparin as the substrate for the *S. mansoni* extract.

W.P.R.

553—Journal of the Japanese Veterinary Medical Association.

- a. ITO, R. ET AL., 1957.—[Experiments on anthelmintic effect of piperazine derivative upon intestinal parasites of puppies.] **10** (7), 306–307. [In Japanese.]
 b. WATANABE, S. ET AL., 1957.—[Experiments on anthelmintic effects of piperazine compounds upon ascarids. II. Experiments on avian ascarids.] **10** (7), 307–309. [In Japanese.]
 c. EZAKI, Y., 1957.—[Ecological studies on *Lymnaea* snails. I.] **10** (8), 375–378. [In Japanese.]
 d. IWATA, J. ET AL., 1957.—[Experiments on the removal of avian ascarids with phenothiazine.] **10** (9), 406–408. [In Japanese.]
 e. KONNO, S., 1957.—[On an abnormal form of *Cysticercus fasciolaris*.] **10** (9), 432–434. [In Japanese.]
 f. HOSOYA, H. ET AL., 1957.—[On Filariae found in black spider monkey and eland-cow.] **10** (9), 435–436. [In Japanese.]
 g. OISHI, I. ET AL., 1957.—[Anthelmintic effects of four piperazine derivatives upon *Toxocara canis*.] **10** (11), 507–509. [In Japanese.]
 h. EZAKI, Y., 1957.—[Ecological studies on *Lymnaea* snails. II. On egg laying.] **10** (12), 579–582. [In Japanese.]
 i. WATANABE, S. ET AL., 1957.—[Studies on the intermediate host of *Moniezia expansa*.] **10** (12), 582–585. [In Japanese.]

(553a) By administering 100 mg. of piperazine hydrate per kg. body-weight twice at 48-hour intervals to puppies, a piperazine derivative was found to be anthelmintically highly effective against ascarids, slightly effective against hookworms, and without effect against tapeworms.

M.Y.

(553b) Four piperazine derivatives were found to be effective against avian ascarids, the minimum dose necessary being 100 mg. per kg. for piperazine dithiocarbamate, 100 to 150 mg. per kg. for the sulphate, and 200 mg. per kg. for the adipate and the malate.

M.Y.

(553c) Life span and activity in aquaria of *Fossaria ollula* (*Lymnaea pervia*) were found to be dependent on food and temperature. *Oscillatoria* and mud kept the animals in good condition. The higher the temperature, the shorter the life span and the higher the activity.

The animals came up to the surface during summer and went down into the water during winter. The winter specimens were considered to play an important role in the life-cycle of *Fasciola hepatica*. M.Y.

(553d) From 67 to 79 days after administration of phenothiazine, the number of ascarid eggs appearing in the faeces as well as the hatching percentage decreased in both naturally and experimentally infected chickens. Phenothiazine did not prevent chickens from being infected. The long term administration of this drug produced no appreciable effect on the host. Addition of inorganic salts and minerals did not intensify the anthelmintic effect. M.Y.

(553e) Histological details are given concerning two abnormal forms of *Cysticercus fasciolaris* with a protrusion which eventually attained a segmental structure and excretory tubules. The abnormality was probably induced by an accidental stimulus which initiated an abnormal differentiation at a point with a property similar to the growth region. M.Y.

(553f) *Dipetalonema gracile* was found in the peritoneum and mesentery of the black spider monkey and *Setaria marshalli* in the abdominal cavity of a cow eland. Morphological details, including statistical measurements, are given for both species of parasite. M.Y.

(553g) The anthelmintic effect of four piperazine derivatives, namely, the malate, the phosphate, the di-laurylsulphate and the sulphate, was found to be so rapid that *Toxocara canis* were still alive when evacuated from puppies. The minimum effective dose of the malate, the most effective derivative tested, was 100 mg. per kg. of piperazine base. Only the di-laurylsulphate produced any toxic side reactions in the host. M.Y.

(553h) Spawning activity of *Fossaria ollula* was high during the summer months, from April to September. It was completely inhibited below 4.5°C. and greatly reduced above 28°C., the optimum being 20°C. There was a correlation between the spawning period and the life span. The shape of an egg-mass and the number of eggs contained in it varied with temperature and season. M.Y.

(553i) Methods of collection of mites which were adapted to the Japanese climate were devised. Of four species collected, only one unidentified species was found to be the intermediate host of *Moniezia expansa*. The rate of infection varied from 0.33% to 1.89%, being higher from April to July. The morphology of the cysticercoid is briefly described. M.Y.

554—Journal of the Mount Sinai Hospital, New York.

- a. LICHTENBERG, F., 1957.—“The early phase of endemic bancroftian filariasis in the male. Pathological study.” 24 (6), 983–1000.
- b. TERPLAN, K., KRAUS, R. & BARNES, S., 1957.—“Eosinophilic meningo-encephalitis, with predominantly cerebellar changes caused by *Trichinella* infection.” 24 (6), 1293–1309.

(554a) 24 early cases were selected from 73 cases of endemic genital bancroftian filariasis for histological study of lymph vessel damage, exudative inflammation and vein damage. The histological picture was very variable. Lymphangiectasia with transient mild inflammation was associated with living worms. Spreading thrombolymphangitis with marked exudative inflammation and fibrosis was associated with disintegrating worms. Granulomatous lymphangitis was found near these worms, but non-specific lesions at a distance from them. Thrombophlebitis occurred in over one third of the cases. Most endemically infected patients pass through a carrier stage rather than a stage of clinically active disease, and it is suggested that hypersensitivity is important in the latter cases. The metabolic products of adult worms may sensitize the tissues, eliciting fleeting hypersensitivity reactions. During early disintegration the worms are not walled off and therefore considerable amounts of disintegration products can reach the tissues, causing thrombolymphangitis, exudative inflammation and sometimes thrombophlebitis. Later on, when other worms die, new active lesions are produced which overlap with healing and scarring of lesions of worms which died earlier, and eventually produce irreversible damage, similar to the tertiary lesions of other inflammatory diseases. W.A.F.W.

555—Journal of Pharmacology and Experimental Therapeutics.

- a. HARFENIST, M., FANELLI, R. V., BALTZLY, R., BROWN, H. W., HUSSEY, K. L. & CHAN, K. F., 1957.—“The relation of piperazine mono-quaternary salt structure to activity against *Syphacia obvelata*, a mouse pinworm.” **121** (3), 347–353.

(555a) This paper records a detailed investigation into the relationship of the molecular structure of a number of piperazine monoquaternary compounds to anthelmintic activity against *Syphacia obvelata* in the mouse and to the acute oral toxicity in the mouse. 68 compounds of nine distinct types were synthesized and tested to determine activity and the oral LD₅₀. From the therapeutic indices thus obtained the comparative values of the compounds as anthelmintics could be assessed. The maximum in the therapeutic index occurred with the 1-methyl-1-tridecyl- or 1-methyl-1-tetradecyl-piperazinium halides, and the best therapeutic indices were found where in this type of compound the substituent on the other nitrogen was carbethoxy or diethylcarbamyl. [For chemical detail this paper should be read in the original.]

O.D.S.

556—Journal of the Royal Army Veterinary Corps.

- a. CLABBY, J., 1957.—“An experiment in the control of canine filariasis.” **28** (3), 114–115.

(556a) Twenty-two young dogs arriving in Singapore from England were given banocide over a period of nine months at dosages from 1,000 mg. once in three months, to 600 mg. monthly in three separate daily doses. No prophylactic effect against *Dirofilaria immitis* infection was observed in comparison with eight control dogs which received no diethyl-carbamazine. Clabby concludes that since the possibility of prevention or cure of heartworm infection by drugs holds out little hope at present, the control of the vector mosquito on Singapore Island is vital.

W.A.F.W.

557—Journal of the Science of Food and Agriculture. London.

- a. CALL, F., 1957.—“Soil fumigation. VI. The distribution of ethylene dibromide round an injection point.” **8**, 591–596.
b. CALL, F., 1957.—“The mechanism of sorption of ethylene dibromide on moist soils.” **8**, 630–639.

(557a) Ethylene dibromide was injected into a number of soils and concentration time curves were plotted for a depth of six inches at various distances from the injection point. The results did not show a downward gravity flow of vapour and Call concludes that diffusion is the most important factor controlling distribution. In all the soils tested the ranges of the median lethal dose of ethylene dibromide (this value is hypothetical) were found to have a linear relationship with porosity at 10° and 20°C. The results indicate that low concentrations of EDB near the soil surface are due to loss of fumigant to the air. It is suggested that in order to obtain adequate concentrations at the surface, the soil pores should be reduced by sealing the soil surface with water or by an impervious covering. It is further suggested that fields should be fumigated when the soil is well compacted before cultivation as a seed bed. The most important variable controlling the airspaces of a soil is water content.

H.R.W.

(557b) The mechanism of sorption of the nematicide ethylene dibromide on moist soils is described. It is shown that swelling of soils, associated with an increase of the spaces in the basal lattice of the montmorillonite, allows the ethylene dibromide to penetrate these spaces. Water isotherm and swelling curves suggest that ethylene dibromide and water molecules compete for adsorption on the surface atoms of the layers. It is suggested that sorption of ethylene dibromide can be accounted for by solution in the soil water together with sorption at the water interfaces.

H.R.W.

558—Journal of Tropical Medicine and Hygiene.

- a. CRIDLAND, C. C., 1957.—“Ecological factors affecting the numbers of snails in permanent bodies of water.” **60** (10), 250–256.
- b. CRIDLAND, C. C., 1957.—“Ecological factors affecting the numbers of snails in temporary bodies of water.” **60** (12), 287–293.

(558a) Cridland reports on observations of the fluctuation in numbers of four species of snail in a lake in Uganda with reference to climatic conditions and to infection with trematode larvae. He suggests that occasional reductions in the number of snails may be attributable to mortality as the result of trematode infections. P.K.

(558b) Cridland has carried out field observations on the fluctuations in density of snail populations in a natural habitat which dries up completely during the course of a year. The snails concerned were *Lymnaea natalensis*, *Bulinus forskali* and *B. (Physopsis) nasutus*. Different species showed varying ability to aestivate but parasitized individuals did not survive. Laboratory experiments with *B. nasutus*, *L. natalensis* and *Biomphalaria sudanica* were carried out and the results appear to confirm the field observations. C.W.

559—Karakulevodstvo i Zverovodstvo.

- a. DUBNITSKI, A. A., 1957.—[The infestation of fur-bearing animals by acanthocephalan parasites.] **10** (4), 52–54. [In Russian.]

(559a) Dubnitski examined 32 young mink and found them infected with *Acanthocephala*, with an intensity of 15–80 specimens per mink. The majority, 92.4% were found in the rectum, 7.6% in the small intestine and in three animals the worms were found in the body-cavity. Those parasitic in the small intestine were *Corynosoma strumosum*, and *C. semerme* were found in the rectum. The author examined fish fed to the mink and found the larval stages of *C. semerme* in 12 *Acerina cernua* out of 19 dissected and in 34 out of 36 *Osmerus eperlanus*. The larvae of *C. strumosum* were found in the body-cavity of perch. Dubnitski infected kittens experimentally with the larvae of *C. semerme* and on post-mortem seven days later, one of the kittens was found to be infected. These *Acanthocephala* were also found in Arctic foxes but with lighter intensity. They are of great pathological importance for fur-bearing animals. Drawings of both species and their proboscides are included in this paper. C.R.

560—Landwirtschaftliches Jahrbuch der Schweiz.

- a. STÖCKLI, A., 1957.—“Über das Vorkommen der freilebenden, pflanzenparasitären Ring-nematoden in Wiesen- und Ackerland.” **71** (8), 963–977.

(560a) Stöckli has investigated the occurrence of ring nematodes, *Criconeimoides* spp., in the alpine meadows and cultivated soils of the Swiss foothills and plateau. He found considerable numbers, mostly of *C. annulifer*, *C. rusticum* and *C. informe*, in the permanent meadows which are cut for hay, but these declined when the fields were treated as permanent pasture or ploughed up. Heavy soils tended to contain very few nematodes and ploughing up of meadows also caused them to disappear. There was no correlation between the nematodes and the growing of fruit trees but various species of clover probably are hosts. pH, calcium and humus levels seemed to have no influence on the nematodes. Crop rotation after ploughing and the subsequent introduction of annual weeds seems to be an easy and cheap method of control. J.B.G.

561—Leaflet. United States Department of Agriculture.

- a. DARROW, G. M., MCGREW, J. R. & SCOTT, D. H., 1957.—“Reducing virus and nematode damage to strawberry plants.” No. 414, 8 pp.

(561a) Strawberry plants (made dormant by storage for at least two weeks at 30°F.) may be treated either (i) by immersion in water at 127°F. for two minutes or (ii) by immersion for seven minutes in water at 121°F., to control nematode infestation. The former treatment

is recommended if the plants are only infected with root-knot or meadow or root lesion nematodes, and the latter is recommended for insect, mite, root nematode and foliar nematode infested plants. Pre-planting soil fumigation is recommended to keep plants free from nematodes, the recommended dosage rate using ethylene dibromide is $7\frac{1}{2}$ gal. per acre of a product containing 83% EDB, and using dichloropropene, 30 gal. per acre of a 50% product. J.J.H.

562—Maryland Florist.

- a. SCHINDLER, A. F., 1957.—“Dagger nematodes as a pest of greenhouse-grown roses.” No. 47, 4 pp.

(562a) *Xiphinema diversicaudatum* was found frequently associated with poor growth of roses grown in green-houses. Pot experiments proved that the nematodes multiplied on the roots, causing gall formation and reducing plant growth. Recommended control measures include discarding plants from infested beds, thoroughly steam-sterilizing the bed, replanting with clean stock and preventing reinfestation (on tools, etc.) from infested beds. Work in progress indicates that it may be possible to kill the worms *in situ* with a non-phytotoxic chemical.

R.D.W.

563—Médecine Tropicale.

- a. CAILLE, J. & BOURDIN, R., 1957.—“Traitement de l'ankylostomiase par le tétrachloréthylène chez l'adulte et le grand enfant.” 17 (6), 865-875.

(563a) The treatment of 43 cases of hookworm infection with tetrachlorethylene is described. The drug was given in gelatin capsules each containing 1.0 ml. The course of treatment for adults was three, four, or five capsules daily for three days, the capsules being given at five-minute intervals before breakfast. A saline purge was given at midday on the second and third days of treatment. In children, the dose was reduced to about half for those of ten years of age with adjustments up or down with age variation. It is not stated whether the purge was given to children. Stools were examined by direct smear only. Of 43 cases treated 32 were cured after one treatment, nine after two treatments, one after three and one after four treatments. Considerable clinical improvement was observed in severe cases of infection. Toxic side effects were not severe, only the usual but transient giddiness, light-headedness and epigastric discomfort being observed.

O.D.S.

564—Mededelingen van de Landbouwhogeschool en de Opzoekingsstations van de Staat te Gent.

- a. BRANDE, J. VAN DEN, D'HERDE, J. & KIPS, R. H., 1957.—“Verspreiding van dichloorpropaan-dichloorpropeen in verschillende grondsoorten.” 22 (3), 377-386. [English, French & German summaries pp. 384-385.]
- b. BESEMER, A. F. H. & OOSTENBRINK, M., 1957.—“Vergelijking van enkele grondontmettingsmiddelen met nematicide werking.” 22 (3), 387-398. [English summary p. 397.]
- c. KUIPER, K. & DRIJFHOUT, E., 1957.—“Bestrijding van het wortelaaltje *Hoplolaimus uniformis* Thorne, 1949 bij de teelt van peen.” 22 (3), 419-426. [English summary p. 425.]
- d. GILLARD, A. & BRANDE, J. VAN DEN, 1957.—“Belang van de studie der wortelknobbelaaltjes (*Meloidogyne* spp.) in Belgisch Kongo.” 22 (3), 685-694.

(564a) The influence of soil type, organic matter and water content on the distribution of D-D mixture in the soil has been studied. The rate of diffusion of the nematicide in the soil was estimated indirectly by its toxic effect on cysts of the potato-root eelworm. The results suggest that water content of the soil is the chief factor influencing the diffusion of D-D.

H.R.W.

(564b) Control of root-infesting nematodes, *Pratylenchus*, *Hoplolaimus* and *Paratylenchus* spp., in nursery stock and flower and vegetable crops with the nematicides D-D mixture, ethylene dibromide, Vapam, N521 and Nemagon is discussed. The relative efficacies of these chemicals, their phytotoxic properties, residual effects and dosage rates are assessed on the basis of field experiments and some suggestions are made on the design of such experiments.

H.R.W.

(564c) Carrots can suffer considerable damage from the attacks of *Hoplolaimus uniformis* and their yield, size and shape suffer. Soil treatment with D-D mixture or formalin killed more than 90% of the eelworms and greatly improved the growth of carrots. Potatoes as a preceding crop reduced the nematode population and gave better growth of carrots as the following crop, but beet or carrots increased the population and led to poorer carrot crops. Soil examination for nematodes was of practical use in avoiding land heavily infested with *H. uniformis*. J.B.G.

(564d) The authors review the symptoms of root-knot disease and the ecology and distribution of the nematodes causing it. A list is given of the economically important host plants in the Belgian Congo. In most cases the species of *Meloidogyne* is not known, but both *M. hapla* and *M. incognita* var. *acrita* are recorded. Finally there is a brief review of control methods. M.T.F.

565—Medical Journal of Malaya.

- a. COLLINS, C. P., 1957.—“Incidence of helminthiasis in H.M. Naval Base, Singapore.” **12** (2), 448–455.

(565a) During 1956, a total of 1,988 Indian, Chinese, Malayan and European patients in the Asian Hospital of the Naval Base in Singapore (representing a cross-section of the local population) were examined for helminths by direct stool examination and 24.4% of them found positive for *Ascaris lumbricoides*, 5.8% for *Trichuris trichiura* and 3.7% for *Ancylostoma*. Furthermore, four Indians had *Enterobius vermicularis*, one had *Strongyloides stercoralis* and one had *Taenia* sp. In 21 cases double infections were observed. These results, tabulated under ethnic and age groups, when compared with earlier work show that the differences in the rate of infection between the ethnic groups are narrowing, although the Malayan population is still the most highly infected, and that in general incidences are steadily lessening due to better sanitation although no further improvement can be expected with *Trichuris* and *Ascaris* until the use of human manure is abolished and standards in food hygiene raised. G.I.P.

566—Medicina. Revista Mexicana.

- a. BIAGI F., F., 1957.—“Observaciones sobre mansonelosis en la Peninsula de Yucatán. IV. Diagnóstico parasitológico y longitud de las microfilarias.” **37** (769), 145–147.
b. ARGUMOSA, J. A. DE, 1957.—“Tratamiento de la esquistosomiasis mansónica.” **37** (770), 174–185.

(566b) Argumosa gives a comprehensive review of the dosages, efficacy and adverse effects of drugs used in the treatment of schistosomiasis mansoni. He includes in the account emetine, acriflavine, Dicuprene, suramin sodium, gentian violet, stannous oxide, organic antimony compounds, miracil compounds and cortisone, and he gives alternative names for the drugs and the chemical background of most of the antimony compounds. M.McK.

567—Medizinische Klinik.

- a. KRUEGER, M., 1957.—“Bandwurmkuren in Südpersien.” **52** (45), 1975–1976.

(567a) Krueger has treated a series of 78 cases of human *Taenia* infection in South Persia with Vermella capsules. In 42 cases complete cure could be recorded and in only four was there relapse (or possible reinfection). The remaining 40 patients, who did not reappear for after-examination, are assumed to have been cured since all were told that any necessary second course of treatment would be free and because, in South Persia, “nothing leads a patient more quickly back to his doctor than when he is able to report that his medicine has done no good”. A.E.F.

568—Memórias do Instituto Oswaldo Cruz.

- a. FREITAS, J. F. TEIXEIRA DE, 1957.—“Sobre os gêneros *Thelandros* Wedl, 1862 e *Parapharyngodon* Chatterji, 1933, com descrição de *Parapharyngodon alvarengai* sp.n. (Nematoda, Oxyuroidea).” **55** (1), 21-45.
- b. DOBBIN, Jr., J. E., 1957.—“Notas sobre as espécies de *Haematoloechus* Looss, 1899 que ocorrem na America do Sul.” **55** (2), 167-175.

(568a) Freitas discusses the literature on the genus *Thelandros* Wedl, and concludes that Chatterji's separation of the alate forms into a separate genus *Parapharyngodon* is valid and that this name has priority over *Pseudothelandros* Read, Amrein & Walton. A review of the genera *Thelandros* and *Parapharyngodon* then follows and the paper concludes with a description of a new species in this second genus, *P. alvarengai* n.sp. from the large intestine of a lizard, *Mabuya maculata* (Gray) from the island of Fernando de Noronha off the Brazilian coast. The description of the new species includes observations on a young male and the third-stage and fourth-stage larvae as well as a series of adults. *P. alvarengai* is distinguished from *P. echinatus* (Rudolphi, 1819), *P. micipsae* (Seurat, 1917) and *P. almoriensis* (Karve, 1949) by the absence of pectinate processes on the anterior edge of the cloaca, from *P. sceleratus* (Travassos, 1923), *P. maplestoni* Chatterji, 1933 and *P. rotundus* (Malau, 1939) by the numbers of pairs of caudal papillae, from *P. cinctus* (Linstow, 1897), *P. annulatus* (Linstow, 1899) and *P. kasauli* (Chatterji, 1935) by the absence of a post-anal projection, from *P. sexlabiata* (Ortlepp, 1933) by the different position of the pair of papillae on the caudal appendix (which lie in the first third and not near the tip) and from *P. seurati* (Sandground, 1936) by the difference in the lateral alae which are not developed in the posterior region of the body. c.w.

(568b) Dobbin presents a revision of the South American members of the genus *Haematoloechus*. *H. neivai* and *H. iurbei* are redescribed. *H. tejeræ* (Cordero & Vogelsang, 1939) is referred to the synonymy of *H. lutzi* Freitas & Lent, 1939, and *H. medioplexus* Uribe-Piedrahita, 1948 to that of *H. iurbei* (Cordero & Vogelsang, 1939). c.w.

569—Münchener Medizinische Wochenschrift.

- a. BLEICHING, E. P. & BOPP, K. P., 1957.—“Beitrag zur menschlichen Trichostrongyloidose in Deutschland.” **99** (50), 1900-1901. [English summary p. 1900.]

(569a) Bleiching & Bopp point out that native human infections with *Trichostrongylus* are practically unknown in Germany but are common in Iran. The recent influx of Iranian students into German universities has led to several cases being recorded. Two cases which had to be treated in hospital are described. A.E.F.

570—Nematologica.

- a. GOFFART, H., 1957.—“Eröffnungsansprache.” [Report of the 4th Symposium on Plant Parasitic Nematodes, Hamburg, September 5-7, 1957.] **2**, Supplement pp. 337S-341S.
- b. OOSTENBRINK, M., 1957.—“Das Vorkommen von Artgemischen bei pflanzenparasitären Nematoden.” **2**, Supplement pp. 342S-346S. [English summary p. 345S. Discussion p. 346S.]
- c. PAESLER, F., 1957.—“Über einige in Champignonkulturen gefundene Nematoden aus den Gattungen *Bunonema*, *Ditylenchus*, *Deladenus* und *Aphelenchoides*.” **2**, Supplement p. 347S.
- d. LOOF, P. A. A., 1957.—“Was ist *Aphelenchus neglectus* Rensch?” [Abstract.] **2**, Supplement p. 348S. [Discussion p. 348S.]
- e. RÜHM, W., 1957.—“Nematoden und biologische Bekämpfung der Insekten.” **2**, Supplement pp. 349S-354S. [English summary p. 353S. Discussion p. 354S.]
- f. SEINHORST, J. W., 1957.—“Some aspects of the biology and ecology of stem eelworms.” **2**, Supplement pp. 355S-361S. [German summary p. 360S. Discussion p. 361S.]
- g. DUNNING, R. A., 1957.—“Stem eelworm invasion of seedling sugar beet and development of crown canker.” **2**, Supplement pp. 362S-368S. [German summary pp. 367S-368S. Discussion p. 368S.]
- h. BROWN, E. B., 1957.—“Lucerne stem eelworm in Great Britain.” **2**, Supplement pp. 369S-375S. [German summary pp. 374S-375S. Discussion p. 375S.]

- i. NOLTE, H. W., 1957.—“*Ditylenchus dipsaci* an Zwiebeln in Mitteldeutschland.” 2, Supplement pp. 376S–381S. [English summary p. 380S. Discussion p. 381S.]
- j. SALENTINY, T., 1957.—“Untersuchungen über den Wirtspflanzenkreis einer Rübenrasse von *Ditylenchus dipsaci* in Baden-Württemberg.” 2, Supplement pp. 382S–386S. [English summary pp. 385S–386S.]
- k. FRANKLIN, M. T., 1957.—“Review of the genus *Meloidogyne*.” 2, Supplement pp. 387S–397S. [German summary p. 395S. Discussion p. 397S.]
- l. BRANDE, J. VAN DEN & GILLARD, A., 1957.—“Versuch zur Züchtung nematodenfreier Pflanzen mit Wurzelgallenälchen (*Meloidogyne hapla* Chitwood) verseuchtem Boden durch Regulierung ökologischer Faktoren (ökologischer Pflanzenschutz).” 2, Supplement pp. 398S–404S. [English summary pp. 403S–404S. Discussion p. 404S.]
- m. MINZ, G., 1957.—“Crop damage by nematodes in Israel.” [Abstract.] 2, Supplement p. 405S.
- n. WEISCHER, B., 1957.—“Neuere Gesichtspunkte zur Frage der Biologie und Ökologie der wandernden Wurzel nematoden.” 2, Supplement pp. 406S–412S. [English summary p. 411S. Discussion p. 412S.]
- o. PITCHER, R. S., 1957.—“A critical review of current techniques for the study of migratory root nematodes as etiological agents.” 2, Supplement pp. 413S–423S. [German summary p. 422S. Discussion p. 423S.]
- p. OOSTENBRINK, M., KUIPER, K. & s'JACOB, J. J., 1957.—“*Tagetes* als Feindpflanzen von *Pratylenchus*-Arten.” 2, Supplement pp. 424S–433S. [English summary p. 433S.]
- q. SIMON, L., 1957.—“Nematologische Untersuchungen an Hopfen.” 2, Supplement pp. 434S–440S. [English summary pp. 439S–440S.]

(570a) In his speech opening the Fourth Symposium on Plant Parasitic Nematodes held at Hamburg, Germany, September 5–7, 1957, the President, Dr. H. Goffart welcomed the participants. He explained how the Society of European Nematologists was formed in 1955, and that the committee of the Society decided that the subjects for the Fourth Symposium should be taxonomy, stem eelworm, root-knot nematodes, and migratory nematodes. Goffart followed this with a review of the progress of nematology in Germany from the early 19th century to the present day.

A.M.S.

(570b) The author has investigated the occurrence of mixtures of two or more species of a genus at the same place for six genera of plant-parasitic nematodes (*Heterodera*, *Pratylenchus*, *Paratylenchus*, *Tylenchorhynchus*, *Rotylenchus* and *Meloidogyne*), and shows how one species may become dominant as a result of a particular cropping or soil type, and may be subsequently suppressed by a change in environment.

J.J.H.

(570c) [A fuller account of this paper appeared in *Nematologica*, 1957, 2, 314–328. For abstract see Helm. Abs., 26, No. 426g.]

(570d) The taxonomic position of *Pratylenchus neglectus* is discussed. It is suggested that further research should be done to determine whether this is a true species or if in fact it is indistinguishable from *P. minyus*.

H.R.W.

(570e) Rühm discusses the position of nematodes in the control of noxious insects. As those species among the Tylenchida are host-specific and have a fixed life-cycle with a single free-living generation, they are of little importance. Among the less host-specific nematodes, a few species of Steinernematidae and a few facultatively parasitic Rhabditis and diplogasterids appear to show some promise.

J.B.G.

(570f) Seinhorst points out the lack of morphological distinguishing characters of different races of *Ditylenchus dipsaci* and the necessity of determining their identity by testing against a standard range of host plants. These plants are: *Dipsacus fallorum*, *Trifolium pratense*, *T. repens*, *Medicago sativa*, *Pisum sativum*, *Solanum tuberosum*, *Narcissus* sp., *Hyacinthus orientalis* and *Tulipa gesneriana*. Stocks of some races can be built up on fleshy hosts. Soil type plays a great part in population fluctuations though host plant has relatively little effect. Weeds are probably very important in maintaining a certain level of infestation.

J.B.G.

(570g) Dunning gives a brief review of the literature on stem eelworm on beet and mangolds. A map is given showing beet stem eelworm infestations in the Cambridge area for 1954 and 1955. Infected seedling symptoms and the development of crown canker are described and illustrated by photographs. Experiments are described in which seedlings are grown in stem eelworm-infested soil and transplanted to clean soil and vice versa. Healthy seedlings transplanted into infested soil can become infected. Crown canker is more likely to occur on plants showing infection in May irrespective of whether they are grown during the summer in infested or uninfested soil.

D.J.H.

(570h) Brown reviews the occurrence of the lucerne stem eelworm, *Ditylenchus dipsaci* (Kühn) Filipev, in Great Britain since it was first found in 1948 with particular reference to the Eastern counties. A rapid increase in the number of infested fields coincided with the increased use of Northern French varieties of lucerne. An account is given of the symptoms exhibited by lucerne plants attacked by stem eelworm and of the way infested patches spread in the field. The host plants for the lucerne eelworm are given. An attempt to eradicate stem eelworm from patches of soil by use of fire was rather unsuccessful. Reasons for thinking that the infestations in Great Britain are seed borne are given. Experiments with seed fumigated with methyl bromide show that under certain conditions a satisfactory control may be obtained.

D.J.H.

(570i) Nolte found that in 1949 and 1956, when the May rainfall was high, conditions were favourable for attack by *Ditylenchus dipsaci* on young onion plants and this led to extensive damage later. The plant must be in a susceptible stage and the soil have a high moisture content for serious attack to develop. Weeds, particularly *Stellaria media* and *Polygonum* spp., enable the onion race of *D. dipsaci* to persist.

J.B.G.

(570j) Salentiny investigated the host range of a race of *Ditylenchus dipsaci* severely attacking beet in Baden-Württemberg, finding that *Cirsium arvense*, *Fumaria officinalis*, *Agropyron repens* and *Apera spica-venti* were not attacked but all other weeds investigated were hosts. In *Trifolium pratense*, *Medicago sativa*, *Ranunculus arvensis*, *Mercurialis annua*, *Papaver rhoeas*, *Melandrium noctiflorum*, *Lepidium draba*, *Stellaria media* and *Polygonum convolvulus* abnormal symptoms were produced, suggesting these were not entirely suitable hosts. Nematodes did not reproduce in *Trifolium pratense*, *Medicago sativa* or *Hordeum sativum* though they invaded the plants. Attempts to correlate eelworm size with host were inconclusive.

J.B.G.

(570k) Franklin reviews briefly the nomenclature of the root-knot nematodes until the separation of the species by Chitwood in 1949. The characters used for species identification are discussed and also the differences in host range shown by different species and, in some cases, by different populations within the same species. The morphological variability within species and our lack of precise knowledge of its range are emphasized.

M.T.F.

(570l) Three groups of five-week-old tomato plants were planted in soil infested with *Meloidogyne hapla* in early February and placed in a constant environment of (i) daylight at 15°C., (ii) daylight at 20°C. or (iii) artificial light from 3 a.m. to 11 p.m. at 15°C. After six weeks and ten weeks the plants were examined for number of nematode galls, number of egg masses and dry weight of the plants. The greatest numbers of galls and egg masses were found on the plants grown at 20°C., but the biggest plants were those grown under artificial light at 15°C. It is suggested that by suitable control of ecological factors such as temperature and light it may be possible to control root-knot nematodes without inhibiting development of the host plant.

M.T.F.

(570m) Damage caused by root-knot nematode (*Meloidogyne* spp.) to crops under irrigation, such as tomatoes, potatoes, strawberries, tuberoses and banana, is reported. Also most banana plantations are infested with spiral nematodes (*Helicotylenchus* spp. and *Rotylenchus* sp.) causing a reduction in vigour and yield. *Heterodera cacti* and *H. major* attacking potted cacti and wheat respectively are among the cyst-forming nematodes which are wide-spread in Israel. It is hoped by fumigation to obtain clean planting material of strawberries, tuberoses, gladioli and bananas.

A.M.S.

(570n) Weischer recognizes three types of plant injury involving migratory root nematodes: (i) injury due to the nematodes alone, (ii) injury primarily due to the nematodes, other organisms playing a secondary role, and (iii) injury mainly due to other factors, the nematodes playing a minor or negligible role. Under field conditions, type (i) virtually never occurs. In experiments with carrots, *Pratylenchus* and *Paratylenchus* were shown to be true primary parasites, damage by the latter being mainly mechanical and superficial, that by the former deeper and accompanied by chemical injury. *Pratylenchus*, *Hoplolaimus* and *Rotylenchus*, although numerous in soil carrying unthrifty peas, played only a minor pathogenic role. In circular unthrifty patches in vineyards, direct attack by *Pratylenchus*, *Paratylenchus*, *Criconeoides* and *Rotylenchus* was not the main cause of crop injury, although the nematodes may have acted as vectors of soil-borne viruses. Tentative figures for relative pathogenicity suggest that *Paratylenchus* is less injurious than *Pratylenchus*. Some data on the host preferences of migratory nematodes is given.

R.D.W.

(570o) The author describes an experiment of his own, involving heat and D-D treatments of soil taken from an orchard suffering from apple "decline". He uses the results of the experiment to prove the difficulty of demonstrating the plant-parasitic status of migratory root nematodes (in this case mainly species of *Pratylenchus*, *Tylenchorhynchus* and *Paratylenchus*). Possible side effects of the heat treatment on soil macronutrients, mycorrhizal invasion of the roots, heat-labile soil toxins and soil fungistasis are discussed, and the author concludes with a critical review of techniques in use in investigations on the pathogenicity of migratory root nematodes.

J.J.H.

(570p) Sixteen varieties of marigolds (*Tagetes patula* and *T. erecta*), when grown for three to four months, effectively reduced soil populations of *Pratylenchus penetrans*, *P. pratensis* and two other species of *Pratylenchus*, the reduction being of the order of 90%. *Pratylenchus* numbers in the roots of susceptible plants were reduced when these were grown in association with marigolds. The action of *Tagetes* appears to be more directly nematocidal than that of known trap-crops, and more specific than that of conventional nematocides as *Tylenchorhynchus dubius* is also suppressed while *Rotylenchus robustus* and *Criconeoides mutabile* seem to breed without difficulty on marigold roots. In a footnote it is stated that Uhlenbroek & Bijloo (*in litt.*) have found that α -terthienyl, a known constituent of *Tagetes*, is strongly nematocidal.

R.D.W.

(570q) No relation was found between the number of hop root nematodes (*Heterodera humuli*) and that of diseased hop plants. Migratory parasitic nematodes of the genera *Tylenchus*, *Tylenchorhynchus*, *Psilenchus*, *Rotylenchus*, *Pratylenchus*, *Ditylenchus*, *Hoplolaimus*, *Paratylenchus* and *Longidorus* were found in all hop gardens. The number of migratory parasitic nematodes was higher in the soil near diseased hop plants, especially in the region containing adventitious roots. The author considers that the nematodes depress the plant growth and facilitate the entry of pathogenic fungi by piercing the plant roots. An apparatus for the extraction of *H. humuli* cysts in the field, and a counting slide for use with the migratory nematodes, are described.

J.J.H.

571—New Zealand Medical Journal.

a. HILL, B. H., 1957.—"An acute urticarial reaction to piperazine citrate." 56 (315), 572.

(571a) A case history is given of a five-year-old boy who was treated for enterobiasis with piperazine citrate syrup on two occasions three months apart. The first course was followed by no ill effects but the second (500 mg. piperazine citrate, b.d.) was followed by a severe urticaria associated with swelling and irritation of the face, eyelids and penis and with drowsiness. The symptoms reached their peak two days after treatment was stopped and subsided during the next two days during which antihistamine and ephedrine were administered. It is concluded that the reaction produced was allergic in nature and was due to previous exposure to the drug.

O.D.S.

572—Novedades Científicas. Contribuciones Ocasionales del Museo de Historia Natural La Salle, Caracas. Serie Zoológica.

- a. DÍAZ-UNGRÍA, C. & RODRIGO, A. G., 1957.—“Revision de la familia Quadrigyridae (Acanthocephala), con descripción de *Deltania scorzai* gen.n., sp.n.” No. 22, 19 pp. [English summary p. 18.]

(572a) A single adult male of *Deltania scorzai* n.g., n.sp. is described from a pimelodid fish from the Orinoco delta, Venezuela. This acanthocephalan measures 16.647 mm. \times 0.948 mm. (maximum width) and is the largest member of the Quadrigyridae. The proboscis is 0.464 mm. \times 0.447 mm. with three rows of four hooks 134 μ to 194.3 μ long and a posterior row of six hooks 174.2 μ to 201 μ long. There are eight rows of very small body hooks anteriorly. Díaz-Ungriá & Rodrigo annotate the eight species of Acanthocephala and their hosts which have been reported from Venezuela and tabulate some of the characters of the three species of *Quadrigyrus*. The family Quadrigyridae is reviewed and the main characters of its eight genera are compared in a table amplified, from Datta, 1957, to include *Hemigyrus* and *Deltania*.
M.MCK.

573—Oléagineux. Paris.

- a. LUC, M., 1957.—“Nématodes et ‘maladies de Kaïncopé’ du cocotier.” 12 (11), 691–693.

(573a) A disease of coconuts called Kaïncopé, of which the cause is so far unknown, occurs in Togo (French West Africa). Luc extracted nematodes from samples of soil and roots from 12 places where coconuts showed the disease and from six where they were healthy. The soil was 96% to 98% sand and comparatively few nematodes were found. The nematodes were classed as saprophagous, predators and plant parasites. In the last class three species, *Xiphinema campinense*, *Hemicycliophora* n.sp. [the description of this species appears in *Nematologica*, 3, 15–23; for abstract see Helm. Abs., 27, No. 48c] and *Rotylenchus bradys* occurred in significantly greater numbers in the soil samples from disease areas than in those from healthy areas. These species were also extracted from the roots of diseased coconuts in several samples but never from roots of healthy plants. The numbers of these nematodes recovered appear too small for the disease to be caused primarily by them but it is suggested that they might be the means of introducing some other pathogen. They suggest at least that the disease is soil-borne.
M.T.F.

574—Parasitica. Gembloux.

- a. STELTER, H., 1957.—“Untersuchungen über den Kartoffelnematoden *Heterodera rostochiensis* Wollenweber. III. Neue Wirtspflanzen des Kartoffelnematoden.” 13 (3), 87–93.

(574a) In pot and field tests Stelter found potato-root eelworm cysts on *Solanum nigrum* L. and nine varieties of this species, all being new hosts except *S. nigrum* var. *miniatum* Bernh. Other new hosts recorded are *S. aethiopicum* L., *S. armatum* R.Br., *S. asperum* Vahl, *S. astroides* Jacqu., *S. memphiticum* Mart., *S. polyacanthos*, *S. zuccagnianum* Dun., and *Datura ceratocaula* Jacqu. The author suggests that conflicting results in the literature on the host status of certain plants, notably *S. nigrum*, may be due to plants of the same species from different regions reacting differently.
R.D.W.

575—Parazitologicheskii Sbornik.

- a. RAZUMOVA, I. N., 1957.—[The parasitic fauna of *Prometheomys schaposchnikovi*.] 17, 229–236. [In Russian.]
b. BIKHOVSKI, B. E. & NAGIBINA, L. F., 1957.—[Monogenetic trematodes of *Silurus glanis*.] 17, 237–250. [In Russian.]
c. DUBININA, M. N., 1957.—[The study of Ligulinae in the U.S.S.R.] 17, 251–276. [In Russian.]

(575a) The parasite fauna of 105 *Prometheomys schaposchnikovi* caught in Osetia in Russia, included *Dicrocoelium dendriticum*, *Heligmosomum halli*, *Paranoplocephala* sp., *Taenia taeniaeformis* larvae, *T. polyacantha* larvae and 32 external parasites. Furthermore, structures

conditionally identified as cestode larvae, although a rostellum and hooks were not discernible were present in the abdominal and pleural cavities of two of the animals. The specimens of *Paranoplocephala* are described. They were similar to *P. omphalodes* but were smaller and the uterus differentiated sooner. G.I.P.

(575b) Bikhovski & Nagibina, having re-examined existing material of *Ancylodiscoides* from *Silurus glanis* and investigated their own material from the Volga delta, conclude that *S. glanis* is parasitized by three species of *Ancylodiscoides*, namely *A. siluri* (Zandt, 1924), *A. vistulensis* (Siwak, 1932) synonym *A. siluri* (Zandt, 1924) *pro parte* and *A. magnus* n.sp. The new species was present in the Volga material and also in that collected by Belopolskaya in 1947 from the Sea of Azov. The three species are described and figured. They occupy the same position on the gills, but are characterized by differences in the structure of the opisthaptor and the genital apparatus. G.I.P.

(575c) In this paper Dubinina reports her work from 1950 to 1955 on the life-cycles of ligulids in Russia and the morphology of their plerocercoid and adult stages under natural and experimental conditions. Some of this work has already been published [for abstracts see Helm. Abs., 19, No. 430c and 22, No. 868c] and is summarized here. She describes *Digramma nemachili* n.sp. of which four plerocercoids were found in *Nemacheilus* sp. and seven adults in *Mergellus albellus* in Tadzhikistan. The new species is small and resembles *Ligula colymbi* but has 400 to 850 sets of reproductive organs, in two rows. The four species now known for Russia furnish two examples of the doubling of reproductive sets in one out of a pair of species which show parallel development but belong to different genera, i.e. *L. colymbi* and *D. nemachili* parasitizing Cobitidae and *L. intestinalis* and *D. interrupta* parasitizing Cyprinidae. In a water reservoir where *Abramis brama* were simultaneously infected with *L. intestinalis* and *D. interrupta* hybrids occurred with various intermediate types and numbers of sets of reproductive organs. Abnormalities in the position of the genital ducts included one case in which some of the pores opened ventrally while others opened dorsally. G.I.P.

576—Pflanzenschutz. Munich.

- a. DIERCKS, R. & KLEWITZ, R., 1957.—“Zur Lebensweise, zum Wirtspflanzenkreis und zur Bekämpfung einer an Ackerbohnen vorkommenden Rasse des Stengelälchens *Ditylenchus dipsaci* (Kühn) Filipjev.” 9 (8), 110–112.

(576a) A race of *Ditylenchus dipsaci* attacking *Vicia faba* was tested for its ability to attack various other agricultural plants. The nematode only bred and caused severe damage, which is figured, in *V. faba* and *Galeopsis ladanum*. Isolated individuals were found in rye, barley and camomile, none in the other named plants. Control was achieved by treating infested soil in 25 cm. pots with D-D at 6 ml. per pot, or Vapam at 10 ml. per pot six weeks prior to planting, or the addition of 500 ml. per pot of 0.2% Metasystox each day for 10 to 14 days. Spraying with Metasystox had no effect. J.B.G.

577—Pharmacological Reviews.

- a. BUEDING, E. & SWARTZWELDER, C., 1957.—“Anthelmintics.” 9 (3), 329–365.

(577a) This detailed and excellent review of the use and mode of action of anthelmintics currently employed or developed in recent years covers the major fields of ascariasis, trichuriasis, hookworm infection, strongyloidiasis, enterobiasis, trichinelliasis, taeniasis, schistosomiasis and other trematode infections. The use and mode of action of piperazine is given much prominence in the ascariasis and enterobiasis sections as is the recent introduction of dithiazanine for the treatment of trichuriasis. The management of chemotherapy in hookworm infection and strongyloidiasis is discussed at length. The unique character of Bueding's work on the biochemistry of schistosomes is reflected in the detailed treatment of the possible relationships of the molecular structure of schistosomicides to their mode of action by interference with enzyme systems. [This paper, with its 218 references, should be read in detail.] O.D.S.

578—Philippine Journal of Science.

- a. YOGORE, Jr., M. G., 1957.—“Studies on paragonimiasis. I. The molluscan and crustacean hosts of *Paragonimus* in the Philippines.” **86** (1), 37-44.
- b. YOGORE, Jr., M. G., NOBLE, G. A. & CABRERA, B. D., 1957.—“Studies on paragonimiasis. II. The morphology of some of the larval stages of *Paragonimus* in the Philippines.” **86** (1), 47-69.

(578a) After briefly reviewing the paragonimiasis situation and summarizing previous work on the intermediate hosts of the parasite in the Philippines, Yogore describes his own investigations which incriminated the snail *Brotia asperata* and a crab *Parathelphusa* (*Barythelphusa*) *grapsoides* complex as first and second intermediate hosts respectively. Naturally infected snails and crabs belonging to these species were found in mountain streams in the Municipality of Casiguran, Sorsogon Province, Luzon Island. These results confirm the 1950 report of Tubangui *et al.* on the identity of the molluscan host and revise the reports of the same worker on the identity of the crustacean host of *Paragonimus* in the Philippines. It is pointed out that the Philippine species of *Parathelphusa* show considerable variation and the problem of their identification requires further study. J.M.W.

(578b) Yogore *et al.* provide the first detailed description of the second generation redia, cercaria and metacercaria, both encysted and excysted, of the *Paragonimus* parasitic in man in the Philippines. Larval stages were obtained from naturally infected snails of the species *Brotia asperata* and crabs of the species complex *Parathelphusa* (*Barythelphusa*) *grapsoides*, first and second intermediate hosts, respectively, of the parasite in the Philippines. Host specimens were collected from streams in Sorsogon Province, Luzon Island. It is concluded that the species of *Paragonimus* which formed the subject of the investigations was *P. westermani*. J.M.W.

579—Plant Pathology. London.

- a. STANILAND, L. N., 1957.—“The swarming of rhabditid eelworms in mushroom houses.” **6** (2), 61-62.
- b. JOHNSON, R. P. C., 1957.—“An improved cyst counting tray.” **6** (2), 75.
- c. MEAD, H., 1957.—“One-year leys on clover-sick land.” **6** (3), 90-91.
- d. WHITE, J. H., 1957.—“Cereal root eelworm in Durham, 1955.” **6** (3), 107-108.

(579a) *Rhabditis* sp. inhabiting the peat casing of mushroom beds, congregated in waving masses on the surface particularly when it was illuminated. The eelworms attached themselves to any object brought into contact with them and it is clear that they are easily transported about the houses on workers' hands. J.B.G.

(579b) The improved cyst counting tray is made from $\frac{1}{4}$ -inch white Perspex from which an appropriate area in the centre is first removed with an end-mill, leaving $\frac{1}{8}$ -inch walls. Shallow grooves $\frac{1}{8}$ -inch wide are then milled in the bottom of the tray producing a perfectly flat, continuous counting channel which requires no re-adjustment of the microscope focus. Where orthodox milling facilities are not available, a power-drill may be employed. C.C.D.

(579c) In a field trial on land infested with *Ditylenchus dipsaci*, using various legume and grass seed mixtures with the grass constituent constant for all mixtures, it was found that alsike and big-leaved white clover can contribute substantially to hay yields from one-year leys on infested land. Broad red clover was found to be highly susceptible to the pest. A.M.S.

(579d) Cereal root eelworm (*Heterodera major*) was found in 55% of fields examined in a survey of a limited area of County Durham, and patchiness due to the eelworm was found in 18% of them. The method of sampling is described. There is a correlation between the rapidity with which the eelworm is found and the degree of infestation shown by the crop. The results of the survey suggest that cereal root eelworm is particularly a pest of smaller farms on which it is often difficult to ensure sound rotational practice. J.J.H.

580—Proceedings of the California Fig Institute.

- a. WARNER, R. M. & McBETH, C. W., 1957.—“Effect of Nemagon applied to living fig trees.” 11th Annual Research Conference, pp. 29–31.

(580a) Warner & McBeth describe the treatment of living fig trees with Nemagon at rates of 2½–10 [U.S.] gal. per acre to control root nematodes. Treatment increased trunk circumference and twig growth, when compared with untreated controls. J.E.P.

581—Proceedings of the Florida State Horticultural Society.

- a. AYERS, E. L., 1957.—“Current position of State Plant Board in control of burrowing nematode.” 70, 54–55.
 b. SUIT, R. F. & BROOKS, T. L., 1957.—“Current information relating to barriers for the burrowing nematode.” 70, 55–57.
 c. DuCHARME, E. P., 1957.—“How burrowing nematodes affect citrus roots.” 70, 58–60.
 d. FEDER, W. A. & FORD, H. W., 1957.—“Susceptibility of certain citrus varieties, species, and relatives to the burrowing nematode.” 70, 60–63.
 e. RENNINGER, G. & SOKOLOFF, B., 1957.—“The experimental studies on citrus nematodes.” 70, 63–66.
 f. TARJAN, A. C., 1957.—“Spray materials for decontaminating nematode-infested grove equipment.” 70, 85–90.
 g. BURGIS, D. S. & OVERMAN, A. J., 1957.—“Chemicals which act as combination herbicides, nematocides and soil fungicides: I. Effect on field-seeded tomatoes.” 70, 137–139.
 h. OVERMAN, A. J. & BURGIS, D. S., 1957.—“Chemicals which act as combination herbicides, nematocides and soil fungicides: II. Effect on soil microorganisms.” 70, 139–143.
 i. SHARPE, R. H., 1957.—“Okinawa peach shows promising resistance to root-knot nematodes.” 70, 320–322.
 j. KELSHEIMER, E. G. & OVERMAN, A. J., 1957.—“Nematodes affecting Florida chrysanthemums and their control.” 70, 350–352.

(581a) Ayers reports the recommencement of the “push and treat” programme for control of burrowing nematode in citrus plantations, after a court action by growers had brought it to a standstill. A higher court ruling has allowed the State Plant Board to continue these control measures, entailing the pushing down of infested trees and a margin of healthy trees around the infested area, followed by chemical treatment of the soil, providing that compensation is paid for the healthy trees removed. Six thousand acres of citrus are still infested, although 3,500 trees have been removed. Further action regarding inspection of nursery stock and approval of nursery sites is also likely to become part of the programme.

A.M.S.

(581b) The development of barriers to the burrowing nematode, *Radopholus similis*, in citrus plantations, is being investigated as a possible alternative to the “push and treat” method of control at present in use. Soil injection with D-D and Nemagon at a depth of 12 inches, to give barriers of various widths from 8 to 100 feet, is being tried. For the treatments, 90 gallons D-D plus 10 gallons Nemagon per acre, and 100 gallons D-D per acre have been used alternately at six-monthly intervals, and the barriers set up well in advance of the apparent limit of the infested areas. The citrus roots are killed by the treatment, but grow back about two feet into the treated soil in six months. The effectiveness of most of the barriers has not yet been put to the test, since the infestation has not yet reached them, but several have been failures. Of the thirteen barriers still being maintained, one appears to show some success. With this method the infested plants remain inside the barrier, whereas with “push and treat” method they are removed and the infested soil treated.

A.M.S.

(581c) Ducharme describes how burrowing nematodes (*Radopholus similis*) penetrate citrus rootlets, their effect on the roots and how secondary organisms such as bacteria, fungi and mites eventually cause complete rootlet destruction leading to the decline of parasitized trees. In sterile root cultures the burrowing nematode causes the pericycle of primary roots to grow causing cigar-shaped tumours. These are not as large and do not occur so frequently on roots in the field owing to rapid root decomposition caused by microbial activity.

D.J.H.

(581d) Feder & Ford tested some 500 citrus varieties, species or relatives for resistance to the burrowing nematode, *Radopholus similis*. The plants were separated into susceptible, tolerant or resistant groups and a table is given for some of the results. Several plants were tolerant to an attack and a few showed a considerable degree of resistance. D.J.H.

(581e) Renninger & Sokoloff report on the use of water soluble hydrogenated fish oil (FOAH) as a nematocide for citrus nematodes. Two sprayings on the soil surface with 1.0 or 1.5% solutions of this compound gave about 90% reduction in the soil eelworm population. An application of FOAH with piperazine citrate hydride gave about 96% reduction in the eelworm population. 1.0 or 1.5% concentrations of FOAH are not toxic to citrus seedlings. Details are given of a pumping sprayer for FOAH application eight to twelve feet below the soil surface. D.J.H.

(581f) Tarjan describes laboratory and field tests carried out to find a suitable means of disinfection of agricultural machinery contaminated with soil infested with *Radopholus similis*. A thorough washing of the machinery with water was found to be preferable. 1% caprylic acid and 2.6% sodium hypochlorite were also effective as machinery disinfectants. J.E.P.

(581g) Burgis & Overman used Vapam, Mylone, allyl alcohol, allyl alcohol and D-D mixture, allyl alcohol and EDB mixture, allyl alcohol and V-C 13 mixture and M.R. 3908 in a replicated experiment on fine sandy soil subsequently seeded with tomatoes. In general Vapam gave the best combined weed control and yield response. J.E.P.

(581h) All treatments referred to in the preceding abstract were found to be effective fungicides except M.R. 3908. Initial reductions, following treatment, in nematode populations were often followed by build-up of larger numbers than found in the untreated control. EDB, Vapam, and allyl alcohol and EDB mixture gave the best all round control of fungi, nematodes and weeds. J.E.P.

(581i) 37 peach seedlings grown in root-knot infested soil in Florida, from seed obtained from Okinawa, showed no galls or very few small ones. Rooted cuttings from these plants were inoculated with *Meloidogyne incognita*, *M. incognita* var. *acrita* and *M. javanica*. No galls were formed by the first two and with *M. javanica* eight plants had no galls and 16 had only a few. The seedlings were also highly resistant to the burrowing nematode (*Radopholus similis*). The fruit of the Okinawa peach is small but it has been crossed with other varieties and the seedlings have proved resistant to root-knot. It has proved suitable as a rootstock for several peach varieties. M.T.F.

(581j) A brief description of damage caused by *Meloidogyne* spp., *Trichodorus* spp. and *Belonolaimus* sp. is followed by a shorter section on control measures using soil fumigants. Methyl bromide, Vapam, Crag-Mylone, Nemagon plus allyl alcohol and EDB plus allyl alcohol were used on soil planted with three chrysanthemum varieties in 1957 and all affected the growth of the plants. It was concluded that Vapam, Crag-Mylone and methyl bromide were excellent nematocides. Steam sterilization is discussed; a portable steam sterilizer has been "dreamed up and built". J.J.H.

582—Proceedings of the Iowa Academy of Science.

- a. ULMER, M. J. & SOMMER, S. C., 1957.—"Development of sporocysts of the turtle lung fluke, *Heronimus chelydrae* MacCallum (Trematoda: Heronimidae)." **64**, 601-613.
- b. GOODMAN, J. D., 1957.—"A snake trematode with an unusual condition of the genital atrium." **64**, 633-637.

(582a) The development of the sporocyst of *Heronimus chelydrae* proved unusual for digenetic trematodes, showing branching of the sporocysts and an apparent lack of a second generation. In *Physa gyrina*, exposed to single and multiple infections, the miracidia passed to the mantle chamber there giving rise to sporocysts. Four days after infection the sporocysts

contained cercarial embryos and showed accumulations of nuclei in the wall at the site of future branching. Sporocysts from a 14-day multiple infection had 10 to 12 branches, those from a 24-day infection had the full complement of 14 branches on each side. Birth pores were detected at the tips of some of the branches. Both sporocysts and branches pulsated vigorously. In single infections, 27-day sporocysts (in one case also an 18-day one) were sluggish and mottled, having apparently reached their limits of cercarial production. Even at this age eye spots were still apparent. Development was slower in multiple infections. G.I.P.

(582b) One of two *Ochetosoma vallida* collected from the mouth of *Coleuber constrictor flaviventris* in Van Buren County, Iowa, showed an abnormal position of the male genital opening, which was intercaecal, and of the uterine opening, which was at the extreme left edge of the body. 40% of the uterine contents were abnormal consisting chiefly of vitelline masses, but other genital organs appeared to be normally developed. Goodman points out that in this family the position of genital openings determines generic identity; he refers to literature reporting similar anomalies and discusses the possible causative factors. G.I.P.

583—Proceedings of the National Academy of Sciences, India. Section B.

- a. JAIN, S. L., 1957.—“Monogenea of Indian fresh-water fishes. V. *Dactylogyrus multispiralis* n.sp. (subfamily Dactylogyrinae) from the gill filaments of *Silondia silondia* (Ham.), from Lucknow, India.” 27 (1), 26–30.
- b. JAIN, S. L., 1957.—“Monogenea of Indian fresh-water fishes. VI. Three new trematodes belonging to the genus *Neodactylogyrus* Price, 1938 (family Dactylogyridae), from some fresh-water fishes of Lucknow, India.” 27 (1), 53–63.

(583a) *Dactylohyrus multispiralis* n.sp., from the gills of *Silundia silondia* at Lucknow, differs from *D. apogonis* in the shape of the anchor bases, the relatively small size of the bar and the very small size of the hooks and from both *D. auriculatus* and *D. cordus* by possessing conspicuous supporting bars in the haptor and the shape of the bar and of the hooks, and from all three species in the characteristic shape of the cirrus which is thrown into 15 to 19 definite loops and the floral arrangement of the five to six plates of the accessory piece at the distal end of the cirrus. Jain, by restricting the species with one bar to the genus *Dactylogyrus* and those with two bars to the genus *Neodactylogyrus*, recognizes the validity of *Neodactylogyrus*. R.T.L.

(583b) Jain describes and figures three new species collected from the Lucknow fish market: *Neodactylogyrus calbasi* n.sp. from *Labeo calbasu* differs from *N. affinis* and *N. kulwieci* in that its cirrus is firmly articulated into the base of the accessory piece, the anchors have stout bases and strong shafts with fine recurved points and the seven pairs of hooks are dissimilar in size although similar in shape. *N. indicus* n.sp. from *Puntius stigma* shows affinities with *N. affinis* and *N. kulwieci* but can be distinguished by the shape of the anchor bases which have long superficial roots, the deep root being represented by two indentations, the accessory piece is poorly developed, the sickle-shaped hooks are equally developed and the copulatory complex has a cirrhal thread. It also differs from *N. albasi* for the ventral bar has a long straight shaft, the fifth hook is almost similar in size to the remaining hooks, the accessory piece its plate-like in shape and weakly developed and there is a cirrhal thread. *N. cotius* n.sp. from *Rohitee cotio* cannot be accommodated in any of the known species owing to the cirrus having three loops, the accessory piece is made up of a ring and handle, while the hooks are crotchet shaped. R.T.L.

584—Proceedings of the Royal Society of Medicine.

- a. CUNNINGHAM, A. A., 1957.—“Eosinophilic leukaemia in eosinophilic family. ?Larva migrans syndrome.” 50 (9), 714–716.

(584a) Cunningham reports a case of eosinophilia which it was considered possibly might have been due to *Toxocara canis* infection (visceral larva migrans syndrome). The clinical and laboratory evidence at first pointed to eosinophilic leukaemia with familial eosinophilia; but later serological tests indicated some likelihood of larva migrans syndrome. J.M.W.

585—Proceedings of the Society for Experimental Biology and Medicine.

- a. COKER, C. M., 1957.—“Effect of cortisone on natural immunity to *Schistosoma mansoni* in mice.” **96** (1), 1-3.
- b. CHERNIN, E., 1957.—“A method of securing bacteriologically sterile snails (*Australorbis glabratus*).” **96** (1), 204-210.

(585a) Coker has shown in three separate experiments with two strains of mice (white and brown) that treatment with cortisone slightly enhances the natural resistance to infection with *Schistosoma mansoni*. This is a marked contrast to its effect on infections with *Trichinella spiralis* and *Nippostrongylus muris*. Significantly fewer worms were recovered from cortisone-treated than from control mice of both strains. It is suggested that this might be due to the inhibition of cercarial hyaluronidase by the cortisone. S.W.

(585b) Chernin describes a number of experimental attempts to hatch bacteriologically sterile snails. A successful technique has been devised and is described in minute detail. The procedure gave satisfactory results with *Australorbis glabratus* and *Biomphalaria pfeifferi* but tests with *Lymnaea* sp. and *Marisa cornuarietis* were unsuccessful. C.W.

586—Quarterly Journal of the Florida Academy of Sciences.

- a. TARJAN, A. C., 1957.—“An emended description of the marine nematode genus *Halenchus* Cobb, 1933 (Tylenchinae).” **20** (2), 121-125.

(586a) An emended diagnosis of *Halenchus* is given. Tarjan leaves the species in the Tylenchinae. The median bulb is indistinct and the presence of valves questionable. The oesophageal glands overlap the intestine. The vulva is posterior and the ovary single and prodelphic. The male is provided with gubernaculum and bursa. The tails are hooked. Tarjan also discusses other species that have been referred to *Halenchus*. J.B.G.

587—Queensland Journal of Agricultural Science.

- a. COLBRAN, R. C. & SAUNDERS, G. W., 1957.—“Root-knot nematode control in tobacco seedbeds.” **14** (4), 307-309.

(587a) Details are given of trials in which EDB and/or methyl bromide or Vapam 4-S are used for the control of weeds and root-knot (*Meloidogyne javanica*) in tobacco seed-beds. The treatments are compared with control obtained by burning ant bed (the inner woody material of termite mounds) or wood on the seed-bed surface. Results show that sterilization by burning is the most effective seed-bed treatment for tobacco. Methyl bromide gave good control of nematodes and weeds, EDB controlled nematodes but not weeds and Vapam 4-S controlled weeds but not nematodes. D.J.H.

588—Report of the Minister for Agriculture. Dublin.

- a. ANON., 1957.—“Annual report, 1956-57.” 26th (1956-57), 173 pp. + Appendices [82] pp. [See pp. 33-34, 74, 149, [15-16].]

(588a) Amongst other helminths reported from domestic animals from the Republic of Ireland, *Filaroides osleri* was found in the lungs of a dog. This is the first record of this parasite in Ireland. Work on eelworm pests of plants continues. S.W.

589—Report of the Orient Hospital. Beirut.

- a. BERBERIAN, D. A., 1957.—“Host specificity and the effect of digestive juices on ova of *Echinococcus granulosus*.” 10th (1957), pp. 33-43.

(589a) Berberian describes experiments designed to elucidate two interesting puzzles, namely, the rare occurrence of hydatid cysts in dogs chronically infected with adult *Echinococcus granulosus*, and the non-occurrence of the adult worms in man despite frequent exposure to accidental ingestion of scoleces. Gastric juices of man, sheep, cattle, dog and cat failed to disrupt the ova of *E. granulosus* and gastric juice therefore plays no role in the hatching

process. Very few eggs hatched when placed in dog and cat intestinal juices and in dog bile, and the embryos liberated by those which did hatch failed to show active contractions. On the other hand, the intestinal juices and bile of man, sheep and cattle rapidly disrupted the shells of the ova, releasing oncospheres which showed active movements of hooklets and body. The author concludes that natural immunity or susceptibility to infection with hydatids is correlated with the effect upon the eggs of the intestinal juices and bile. J.M.W.

590—Research Bulletin of the Panjab University, Hoshiarpur.

- a. GUPTA, N. K., 1957.—“On two new species of the genus *Neodiplostomum* Railliet, 1919, and discussion on the validity of *Neodiplostomum* (*Neodiplostomum*) *rufeni* Chatterji, 1942.” No. 113 (Zoology), pp. 327–335.
- b. SINGH, S., 1957.—“On the direct origin of the refringent granules from the Golgi spheroids in the spermatogenesis of the nematode, *Polydelphis* sp.” No. 119 (Zoology), pp. 383–388.

(590a) *Neodiplostomum* (*Neodiplostomum*) *lerouxi* n.sp. and *N. garnhami* n.sp. are figured and described from *Lobivanellus indicus* and *Astur badius* respectively. *N. lerouxi* differs from the other members of the subgenus, and from the species which have not been assigned to a subgenus, and resembles *N. brachypterus*; from this species it differs in having a prepharynx, the pharynx being larger than the oral sucker, the oesophagus being well developed, the large tribocytic organ and large body. *N. garnhami* differs from all other species of the genus except *N. morchelloides*, and from *N. morchelloides* by the presence of a very distinct prepharynx, the position of the ventral sucker and the position of the ovary and testes. *N. (N.) rufeni*, regarded by Dubois as a synonym of *N. (N.) hawkei*, is considered to be a valid species. S.W.

(590b) Singh studied spermatogenesis, by means of phase-contrast microscopy, in a *Polydelphis* sp. and obtained results which strongly suggest that the refringent granules have a direct origin from the Golgi spheroids. He reports that towards the end of spermatogenesis the refringent granules fuse to form the horseshoe-shaped acrosome of the sperm. The mitochondria do not form a nebenkern, and lie in the swollen part of the flask-shaped sperm in front of the nucleus. The sperm reaches full maturity in the uterus of the female. W.G.I.

591—Research and Experimental Record of the Ministry of Agriculture, Northern Ireland.

- a. BAXTER, J. T., 1957.—“The effects on lambs of infection by the intestinal parasite *Nematodirus*.” 6, 45–51.

(591a) Baxter, in Northern Ireland, observed outbreaks of disease caused by mixed infections of *Nematodirus battus* and *N. filicollis*. Clinical observations and the results of post-mortem examinations are given. Of the lambs which survived the outbreaks, those which had been clinically affected not only fattened as quickly as those which had shown no clinical symptoms, but they also carried lower worm burdens at the time of slaughter. Baxter discusses the relationship between the availability of the infective stages, the onset of disease and the immune responses of the host animals. H.D.C.

592—Revista de Agricultura. São Paulo.

- a. CESNIK, R., 1957.—“Dois nematódeos parasitando *Tropaeolum majus* L.” 32 (4), 253–260.

(592a) Cesnik found *Meloidogyne javanica* and *Rotylenchus boocki* attacking the roots of *Tropaeolum majus* in Piracicaba, Brazil. The galls were small and the egg masses superficial and dark coloured. Only females of *R. boocki* were found; the ovaries are figured. A key is given for separating the two species of *Helicotylenchus* and three of *Rotylenchus* so far recorded in Brazil. M.T.F.

593—Revista Brasileira de Biologia.

- a. FREITAS, J. F. TEIXEIRA DE, 1957.—“Sobre um novo nematódeo parasito de réptil da Bolívia: *Parapharyngodon senisfaciecaudus* sp.n. (Nematoda, Oxyuroidea).” **17** (4), 451-454.
- b. LORDELLO, L. G. E. & ZAMITH, A. P. L., 1957.—“*Brasilaimus*, a new genus of free-living nematode.” **17** (4), 455-457.
- c. TRAVASSOS, L. & KLOSS, G. R., 1957.—“Nematódeos de invertebrados. 2.^a e 3.^a notas.” **17** (4), 467-477.
- d. KLOSS, G. R., 1957.—“Nematódeos de invertebrados. 4.^a nota.” **17** (4), 491-494.
- e. DOBBIN, Jr., J. E., 1957.—“Sobre uma nova espécie do gênero *Telorchis* Luehe, 1900 (Trematoda, Telorchidae).” **17** (4), 509-512.
- f. ZAGO FILHO, H., 1957.—“Contribuição para o conhecimento de hospedeiros intermediários e definitivos da *Physaloptera praeputialis* Linstow, 1889 (Nematoda, Spiruroidea).” **17** (4), 513-520.

(593a) In *Parapharyngodon senisfaciecaudus* n.sp. from the lizard *Liolaemus lenzi*, from Bolivia, there is no prominence of the post-anal region in the male and no fringe on the anterior border of the cloaca. Three pairs of caudal papillae and one post-anal papilla are present. The ovaries do not encircle the oesophagus and the excretory pore is behind the oesophageal bulb. *P. cameroni* [formerly *Thelandrós cameroni*] is made a new combination. M.McK.

(593b) A single female of *Brasilaimus subaquilis* n.g., n.sp. was found in soil from Brazil. It closely resembles *Carcharolaimus* but has an attenuated tail, a double guiding ring and the cuticularized labial structure is not basket-like. This consists, instead, of two rod-like thickenings extending back from a minutely dentate frontal piece and connected at the junction of the labial region and neck. M.McK.

(593c) Nine new species of nematodes from invertebrates, including one belonging to a new genus, are described (from females only) from Brazil. *Christiella christiella* n.g., n.sp. from *Passalus quadricollis* is similar to *Artigasias* but has no spines on the cephalic end, the oesophagus is fusiform and the oesophageal isthmus is not clearly defined. *Artigasias martinezi* n.sp. from *P. quadricollis* is distinguished from the species of *Artigasias* hitherto reported by the clear separation of the cephalic ring and labial ring. In *A. ovicarenata* n.sp. from *P. quadricollis* there is a cephalic ring as in the previous species but the tail is 0.47 mm. [?]—0.45 mm. long whereas in *A. martinezi* it is 0.12 mm.—0.16 mm. long, the corpus of the oesophagus is slightly claviform instead of subcylindrical and the egg has six longitudinal ridges. *A. wanderbilti* n.sp. from *P. quadricollis* differs from *A. longicauda* chiefly in having a slight smooth inflation of the cuticle at the cephalic end and prominent lips with indistinct papillae. *A. macrovata* n.sp. from *P. quadricollis* is distinguished from *A. inermis* by a smooth cephalic dilatation of the cuticle similar to that of *A. vesiculosa*, from which it differs in the presence of a shorter tail (0.19 mm.—0.22 mm. long) and absence of spines on the cuticle. In *A. coronata* n.sp. from *Paxillus pentaphylloides* the relatively large lips are prominent laterally and have at least six papillae. Both the lips and the cephalic inflation below the lips appear trapezoidal in side view. *A. minuta* n.sp. from *P. pentaphylloides*, the smallest species of *Artigasias*, is 1.16 mm.—1.31 mm. *Hystriognathus heliae* n.sp. from *Paxillus leachii* resembles *H. spinosus* but has a cephalic ring and an elongate conical tail which narrows relatively suddenly. The length of tail, 0.183 mm.—0.198 mm., and position of the vulva a little behind the middle of the body differentiate the new species from *Lepidonema tarda* (= *H. tarda*). In *H. cobbi* n.sp. from *P. leachii* the cuticular spines extend from the anterior third of the corpus of the oesophagus to the posterior end of the corpus, whereas in *H. heliae* they cover the body from a little behind the lips to near the end of the oesophageal bulb. The tail is shorter than in *H. heliae* (about 0.168 mm. long) and the stoma is 0.042 mm.—0.045 mm. in length compared with 0.026 mm.—0.030 mm. M.McK.

(593d) Kloss transfers *Toddia toddi* to *Galebiella* as a new combination. *G. basiri* n.sp. from the water beetle *Hydrous ater* in Brazil and known only from females most closely resembles *G. toddi* but the caudal alae give the tail a sub-conical shape and the transverse cuticular rings, when seen laterally, are rounded, not angular, in section. The male of *Pseudonymus vazi*

from *H. ater* is described for the first time. It is half the size of the female and the posterior end terminates in a rectangular portion with a narrow appendage forming an angle with the longitudinal axis of the body and similar to that of the male of *P. spirotheca*. M.MCK.

(593e) *Telorchis rapidulus* n.sp. from a fresh-water tortoise, *Kinosternon scorpioides scorpioides* from Brazil, which is described and figured from a single specimen, is distinguished from *T. ercolanii* by the shorter oesophagus and longer eggs (0.036 mm.-0.048 mm.), from *T. necturi* by the greater length of the body (6.96 mm.) and of the eggs, and from *T. reelfooti* by the longer cirrus sac (1.50 mm.) and shorter oesophagus. M.MCK.

(593f) Specimens of the 25 types of insects, which were found in cat faeces partially buried in the ground, were exposed to infection with *Physaloptera praeputialis* by (i) feeding them with bread or faeces containing embryonated eggs or (ii), in the case of flies, allowing them to lay eggs on contaminated faeces where the fly larvae could become infected. Third-stage physalopterid larvae were subsequently found in the insects mentioned below. In the 1,230 *Gryllulus assimilis*, the normal host, there were 25 to 50 larvae per insect. Larvae infected all of 263 *Miogryllus verticalis* and 40% of 138 *G. sigilatus* but subsequently became surrounded by chitin in these hosts. Those from *M. verticalis* were infective to cats after the second moult even if they were in the early stages of chitinization. *Arachnomimus speluncae* and *Apotetamenus clypeatus* were about as susceptible to infection as *G. sigilatus* but were never found naturally infected. Only 15% of *Periplaneta americana* and *P. australasiae* became infected. When third-stage larvae were fed to rats and mice the few which became attached to the gastric mucosa did not develop. They persisted less than 50 days in mice and in rats only one was found after 80 days. Larvae from the rat were infective to a cat. M.MCK.

594—Revista Brasileira de Malariologia e Doenças Tropicais.

- a. PESSÔA, S. B. & AMORIM, J. P., 1957.—“Contribuição para a história natural da esquistossomose mansônica no Nordeste Brasileiro, e sugestões para a sua profilaxia.” 9 (1), 5-18. [English summary pp. 17-18.]
- b. RUIZ, J. M., 1957.—“Estudo sobre *Planorbis melleus* Lutz, 1918. Posição da espécie no gênero *Drepanotrema* Fischer & Crosse, 1880.” 9 (1), 51-56. [English summary p. 54.]
- c. RUIZ, J. M., 1957.—“Contribuição ao conhecimento dos planorbídeos da cidade de São Paulo.” 9 (1), 57-65. [English summary p. 62.]
- d. RACHOU, R. G., 1957.—“Distribuição geográfica das filaríoses humanas no Brasil.” 9 (1), 79-100. [English summary p. 86.]
- e. PELLEGRINO, J., 1957.—“Diagnóstico das esquistossomoses pela reação intradérmica.” 9 (1), 105-121. [English summary pp. 117-118.]
- f. MAGALHÃES, A. E. A., 1957.—“Diagnóstico das teníases.” 9 (2), 285-294. [English summary p. 291.]
- g. ZAGO FILHO, H. & PEREIRA BARRETTO, M., 1957.—“Estudo sobre a prevalência e intensidade de infestação por helmintos intestinais em cães e gatos de Ribeirão Preto, S.P.” 9 (2), 295-304. [English summary p. 299.]
- h. ANDRADE, R. M. DE, 1957.—“A draft of the program of ecological (limnological) studies on *Schistosoma mansoni* intermediary hosts, which is being carried out in the city of Belo Horizonte, State of Minas Gerais, Brazil.” 9 (3), 337-341. [Portuguese summary p. 341.]
- i. SOUZA MARTINS, R. DE, 1957.—“Focos ativos de esquistossomose em Niterói, Estado do Rio de Janeiro.” 9 (3), 361-364. [English summary pp. 363-364.]
- j. RODRIGUES DA SILVA, J., 1957.—“Aspectos básicos relativos à terapêutica específica na esquistossomose mansoni. (Estudo de revisão, com referência especialmente à quimioterapia antimonial por via parenteral).” 9 (3), 417-435. [English summary p. 433.]
- k. MELLUCCI, N. M. B., 1957.—“Cariometria do fígado na infecção esquistossomótica.” 9 (3), 437-438. [English summary p. 438.]
- l. REY, L., 1957.—“*Fasciola hepatica* no gado, no Rio Grande do Sul. Investigações sobre a possibilidade de ocorrência de casos humanos.” 9 (4), 473-483. [English summary pp. 482-483.]
- m. BRENER, Z. & CHIARI, E., 1957.—“Ação da fuadina e do miracil D sobre os estádios iniciais de desenvolvimento do *Schistosoma mansoni* no camundongo.” 9 (4), 485-488. [English summary p. 488.]
- n. BRENER, Z., 1957.—“Observações sobre a ação da fuadina e do miracil D em camundongos experimentalmente infectados com *Schistosoma mansoni*.” 9 (4), 489-496. [English summary p. 496.]
- o. BRENER, Z., PELLEGRINO, J. & CHIARI, E., 1957.—“Valor do método de Hoffman, Pons & Janer no diagnóstico da esquistossomose mansoni.” 9 (4), 497-500. [English summary p. 500.]

- p. RACHOU, R. G., LIMA, M. M., POMPEU MEMÓRIA, J. M., FERREIRA NETO, J. A. & AZAMBUJA, C. E. A., 1957.—“Quantidade de sangue ingerido pelo *Culex pipiens fatigans*.” 9 (4), 505-509. [English summary p. 507.]
- q. CHAIA, G. & PAULINI, E., 1957.—“Da ação do pentaclorofenato de sódio e do sulfato de cobre sobre ovos e miracídios de *Schistosoma mansoni*.” 9 (4), 511-514. [English summary p. 513.]
- r. RACHOU, R. G., COSTA, L. & SANTOS, D., 1957.—“Resultado de um inquérito de filariose bancroftiana em João Pessoa, capital da Paraíba, realizado em 1955.” 9 (4), 523-525. [English summary p. 525.]
- s. RACHOU, R. G., 1957.—“Considerações sobre o combate à filariose bancroftiana no Brasil.” 9 (4), 527-536. [English summary pp. 535-536.]
- t. ANDRADE, R. M. DE & PAULINI, E., 1957.—“Nota sobre a composição elementar de *Australorbis glabratus* (Say, 1818), coletados em Belo Horizonte e Neves, Estado de Minas Gerais, Brasil.” 9 (4), 559-565. [English & German summaries pp. 562-563.]

(594a) Pessoa & Amorim have carried out a survey of the natural history of *Schistosoma mansoni* in the States of Paraíba, Sergipe and Alagoas in north-east Brazil. Their conclusions are briefly as follows: the disease primarily affects children who acquire the infection by playing and bathing in polluted waters near their homes from the age of three to four years onwards; there is evidence to indicate that at least a partial resistance to reinfection is developed in adults who, nevertheless, suffer from liver damage and other pathological effects as a result of the childhood infections; control measures must include drainage, provision of sanitation and sanitary education, treatment of infected persons with antimonial drugs and treatment of snail-infested waters with a molluscicide. The molluscicide recommended is a mixture of gammaxane with pitch dissolved in kerosene and dispersed in sand. It is also noted that in an area apparently ideal for snails there were none present; the area was said to be rich in naturally occurring petroleum and the authors suggest trials of crude petroleum products as molluscicides.

C.W.

(594b) Ruiz has studied the anatomy of *Planorbis melleus* Lutz, 1918 and concludes that the species should be placed in the genus *Drepanotrema*. The characters which are of importance in reaching this conclusion are the simple prostatic diverticula, the absence of a separate prostatic duct and the rudimentary flagellum on the penis sheath.

C.W.

(594c) Ruiz describes the results of a snail survey of the city of São Paulo. Within a 10 km. radius of the city centre only three species of planorbid snails were found, the commonest being *Biomphalaria tenagophila* while *B. janeirensis* and *Drepanotrema melleum* were found in only one place each [Ruiz is treating *Australorbis* as a synonym of *Biomphalaria*]. An examination of these snails for cercariae was made and no furcocercariae were found. One *D. melleum* was infected with a xiphidiocercaria and echinostome; xiphidiocercariae and cystocercariae were found in *B. tenagophila*.

C.W.

(594d) Rachou presents the results of a series of surveys, carried out over four years, to determine the distribution of human filarial parasites in Brazil. *Dracunculus medinensis* is not considered because the small foci in Bahia have now disappeared, probably due to unfavourable conditions for the intermediate hosts. As a result, the only two species to receive attention are the imported *Wuchereria bancrofti* and the native *Mansonella ozzardi*. The results of both blood examinations and mosquito dissections are recorded in extensive tables and a comparison of the distribution of the two species is presented as part of the English summary.

C.W.

(594e) Pellegrino reviews the methods of preparing antigens for intradermal tests in the diagnosis of schistosomiasis. Concentration techniques for cercariae, eggs and miracidia are described, as are also perfusion methods for recovery of adult worms from experimental animals. Freeze-drying is recommended for the preservation of the material until it is required for use when it is extracted in saline to dilutions of 1:10,000. Injections of 0.1 to 0.05 ml. are given and the area of the wheal has been found to be the most important criterion in assessing the results; methods for measuring these areas are described. Passive transfer of circulating antibodies to uninfected patients is recorded and the importance of developing biological methods of assay for standardization of antigens is stressed.

C.W.

(594f) Magalhães discusses five methods for the diagnosis of *Taenia* infections in man. These are direct examination, centrifuging and flotation in zinc sulphate, sedimentation in tap-water, scotch-tape swabs and sifting of stools in running water. The last method has proved most successful and an apparatus for carrying it out is described and illustrated. C.W.

(594g) Zago Filho & Barretto have carried out a survey of the intestinal helminths of 81 dogs and 196 cats in the town of Riberão Preto in São Paulo, Brazil. All of the animals examined were parasitized by at least one worm and the following species were found in dogs: *Ancylostoma caninum* (98.76%), *A. braziliense* (82.71%), *Dipylidium caninum* (55.55%) and *Toxocara canis* (41.97%) while the cats were found to harbour *Physaloptera praeputialis* (72.44%), *A. braziliense* (70.91%), *A. caninum* (36.73%), *D. caninum* (50.0%), *T. cati* (48.97%) and *Taenia taeniaeformis* (20.4%). No examinations for *Strongyloides stercoralis* were made so the lack of records for this species does not imply its absence in that area. A series of graphs comparing the intensity of infections of the helminths common to both cats and dogs is provided. C.W.

(594h) Andrade describes the programme of an ecological study on *Australorbis glabratus* in the city of Belo Horizonte, Brazil. Monthly observations are taken at sixty sampling stations throughout the experimental area and details of the type of records made are given. C.W.

(594i) Souza Martins has carried out a survey of the town of Niterói, Rio de Janeiro, Brazil, to determine the incidence of *Schistosoma mansoni*. Seven foci of transmission were discovered, all in streams passing through vegetable gardens. With one exception all of the 92 individuals suffering from the disease were gardeners. The molluscan intermediate host concerned has been identified as *Australorbis nigricans*. 6.3% of these snails from the seven active foci were shown to be infected with *S. mansoni*. C.W.

(594j) Rodrigues da Silva reviews the history of the development of the chemotherapy of schistosomiasis and discusses the various arguments which have been presented against specific treatment. He concludes that, except in certain cases, these arguments are not valid. The paper ends with a discussion of the mode of action of schistosomicidal drugs and the criteria of cure. Ideally, the latter should consist of a negative parasitological examination four months after the treatment, the disappearance of clinical symptoms, the absence of permanent lesions and a return of the eosinophil count to a normal level. C.W.

(594k) Mellucci presents the results of a study on the nuclear sizes and numbers of nucleolar units in the liver cells of mice infected with *Schistosoma mansoni* and treated with foudadin. There is an increase in the size of large nuclei in infected mice and this situation is intensified by treatment with foudadin. C.W.

(594l) A preliminary report of 22 suspected cases of human infection with *Fasciola hepatica* in Rio Grande do Sul, Brazil, led Rey to carry out further investigations and to determine the incidence of liver-fluke in cattle and sheep in the area. Re-examination of 20 of the 22 suspected cases proved negative both for stool examinations and intradermal tests with antigens of *F. hepatica* and *Schistosoma mansoni*. General incidence of *F. hepatica* was found to be 2.24% in cattle and 4.25% in sheep but the local incidence in the regions of Campanha and the Serra do Sudeste was much higher. The probable intermediate host in the area is *Lymnaea viator* d'Orbigny. C.W.

(594m) The action of foudadin and miracil-D against the very young schistosomulae of *Schistosoma mansoni* in mice has been investigated by Brener & Chiari. The mice were infected by intraperitoneal injection of cercariae. Courses of treatment, with either drug, started the day after exposure brought about considerable reduction in the numbers of worms; but when treatment was delayed for two to five weeks from the time of infection it was found that the immature parasites showed great resistance to the drugs. C.W.

(594n) Brener has studied the action of foudadin and miracil-D on *Schistosoma mansoni* in mice. Relationships between the size of dose, the time of treatment and the number of granulomata in the liver are recorded. If treatment is not begun before the parasites commence to lay eggs there is no statistical difference between the numbers of granulomata in treated and untreated control mice. c.w.

(594 o) Brener, Pellegrino & Chiari have compared several methods of faecal examination in the diagnosis of *Schistosoma mansoni* infection in man in Brazil. They conclude that the method of sedimentation in tap-water described by Hoffman, Pons & Janer gives results comparable to the more complicated techniques involving sedimentation in glycerinated water or sodium sulphate-Triton-ether and centrifugation. c.w.

(594p) Rachou and his collaborators have investigated the quantity of blood ingested by *Culex pipiens fatigans*. Freshly-emerged laboratory-reared female mosquitoes were weighed before and after a blood meal. Wild females caught in houses were also weighed before and after feeding. No significant differences in the weight of blood taken up were found between these two groups and the conclusion is reached that the mean weight of a blood meal is 3.21 mg. It is noted that the weights of wild adult females are closer to those of laboratory-bred specimens reared collectively in tanks than to the larger forms raised individually in separate tubes. c.w.

(594q) Chaia & Paulini have carried out experiments to determine the effects of sodium pentachlorophenate and copper sulphate solutions on the eggs and miracidia of *Schistosoma mansoni*. Miracidia were exposed to solutions of PCP and CuSO_4 in groups of 8 to 12 and the minimum and maximum time in seconds for the death of the larvae was recorded. The temperature was maintained between 23°C. and 24°C. for the experiments with PCP and between 27°C. and 28°C. for those with CuSO_4 . The results show that at 8 p.p.m. PCP will kill miracidia in 15 to 124 seconds, at 4 p.p.m. the time taken is 16 to 1,294 seconds and at 2 p.p.m. 180 seconds to one hour but 30.5% were still alive at the end of the hour. For CuSO_4 the data are as follows: 80 p.p.m. 49 to 464 seconds; 40 p.p.m. 27 to 622 seconds and at 20 p.p.m. 68 to 722 seconds. The eggs of *S. mansoni* were not killed after three hours in a 1,000 p.p.m. solution of CuSO_4 or two hours in a 100 p.p.m. solution of PCP. c.w.

(594r) Rachou, Costa & Santos are carrying out a survey to determine the incidence of *Wuchereria bancrofti* in the capitals of the Brazilian states. The present paper describes the results of a survey in João Pessoa, Paraíba. Blood samples (20 cu. mm.) collected between 19.00 and 23.00 hours from 10,503 persons were examined for microfilariae, three were found to be positive, but all of them came from Recife where the incidence of the disease is high. 12,348 mosquitoes were collected from 2,029 houses and the females were dissected. 12,344 of these mosquitoes were identified as *Culex pipiens fatigans*, one of which was found to be carrying a single *Wuchereria* larva. The other four mosquitoes were three specimens of *Culex* sp. and one *Mansonia* sp. The authors conclude that there is no autochthonous filariasis bancrofti in João Pessoa. c.w.

(594s) Rachou reviews the work being done by the Departamento Nacional de Endemias Rurais to control *Wuchereria bancrofti* in Brazil. The principal measure adopted is the treatment of infected persons in the endemic areas with hetrazan. Control of the mosquito intermediate host *Culex pipiens fatigans* is not economic when attempted on a large scale and is therefore practised only in districts where local support makes it possible. c.w.

(594t) Andrade & Paulini have carried out spectrographic analysis of the ash of both shells and soft parts of *Australorbis glabratus* from two localities in Minas Gerais, Brazil. The object of the work is to determine the essential minerals required by the snails in the hope that this information may explain, when related to geological and soil characters, the distribution of this important intermediate host of *Schistosoma mansoni*. Seventeen elements were identified, namely, sodium, magnesium, aluminium, silicon, phosphorus, potassium, calcium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, strontium and barium. Of

these, potassium, chromium, barium, cobalt and nickel were not found in all of the samples. None of the elements was present exclusively in the shell. Ten were found in both shell and soft parts (sodium, magnesium, aluminium, silicon, calcium, vanadium, manganese, iron, copper and strontium). The dominant elements in the soft parts were sodium, magnesium, aluminium, silicon, calcium and iron. The others were recorded as traces only or as being present in variable quantities. Sodium, calcium, manganese and iron were found to be the four principal elements of the shell. C.W.

595—Revista de la Facultad de Agronomía y Veterinaria. Buenos Aires.

- a. BACIGALUPO, J., GRAÑA, A. DA & DOLCETTI, M., 1957.—“Sintomatología y biología de la filariasis de los perros de Buenos Aires.” **14** (1), 3–21. [English summary p. 21.]

(595a) Bacigalupo *et al.* describe the symptoms of canine filariasis due to *Dirofilaria acutuscula* in Buenos Aires, also the biology of the disease. The parasite is referred to *D. acutuscula* because of the lack of periodicity shown by the microfilariae in the peripheral blood and because of the position of the adults in the subcutaneous connective tissue rather than the heart. Of 41 cases examined the majority were short-haired hunting dogs (particularly Pointers), this is attributed to the frequency with which such dogs are taken into rural areas and the relative ease with which the mosquito hosts (*Taeniorhynchus titillans*, *Aedes albifasciatus* and *Psorophora cyaneus*) are able to bite through the coat. C.W.

596—Revista de Medicina Experimental. Lima.

- a. VALVERDE, M., 1957.—“Encuesta de *Enterobius vermicularis* en Huacho y alrededores.” **11** (1/2), 87–91. [English summary pp. 90–91.]

(596a) In Huacho, on the coast of Peru north of Lima, examination of 644 children of 11 years old and under by single examination with adhesive cellophane tape revealed an over-all infection rate with *Enterobius vermicularis* of 32.8%. The infection rate was higher (44.8%) in schoolchildren than in the pre-school group (28.2%). This was a function of the relationship of incidence to age, inasmuch as only 1.8% of children under one year old were infected, 14% of those in the one-year group, 26% of those in the two-year group, and 34% of those in the three-year group. In children of higher age groups the infection rate averaged over 40%. No difference in incidence was observed between the two sexes. J.M.W.

597—Revue Agricole et Sucrière de l'Île Maurice.

- a. ORIAN, G., 1957.—“Une maladie de quelques plantes ornementales causée par un nématode foliaire.” **36** (5), 261–264.

(597a) Damage thought to be due to *Aphelenchoides ritzema-bosi* has been observed on zinnias, dahlias and chrysanthemums in several places in Mauritius. A brief account is given of symptoms and control measures. M.T.F.

598—Roczniki Nauk Rolniczych. Seria A. Roślinna.

- a. WILSKI, A., 1957.—“Badania nad zwalczaniem mątwika burakowego *Heterodera schachtii*, środkami chemicznymi.” **75** (4), 645–666. [English & Russian summaries pp. 664–666.]

(598a) Wilski used five chemicals in pot experiments for the control of *Heterodera schachtii*. Estimates of the numbers of viable cysts in the soil after sugar-beet had been grown showed no effective control although numbers of females on the roots had been reduced. Phytotoxic concentrations did not kill all the nematodes in the soil. In field experiments no toxic effects were shown against *H. schachtii*. Spraying with 0.1% Systox one to four times at fortnightly intervals had no effect on the infestation of the plants. M.T.F.

599—Sbornik Nauchnikh Rabot Altaiskoi Kraevoi Nauchno-Issledovatel'skoi Veterinarnoi Stantsii.

- a. KOROVAEV, N. M., 1957.—[Seasonal and age dynamics of dictyocauliasis in sheep in the Altai territory.] No. 1, pp. 201–212. [In Russian.]
- b. KOROVAEV, N. M., 1957.—[Eradication of *Dictyocaulus* infection in sheep in the Altai territory.] No. 1, pp. 213–235. [In Russian.]
- c. KOROVAEV, N. M., 1957.—[Simultaneous treatment for *Moniezia* and *Dictyocaulus* infections in sheep.] No. 1, pp. 236–241. [In Russian.]
- d. KOROVAEV, N. M., 1957.—[Infestation of the nasal cavities of geese by leeches.] No. 1, pp. 242–244. [In Russian.]
- e. SHOKINA, N. P., 1957.—[The spread of poultry diseases in the Altai territory.] No. 1, pp. 283–289. [In Russian.]
- f. SHOKINA, N. P., 1957.—[A study of the epizootiology of *Heterakis* infection in fowls in the Altai territory.] No. 1, pp. 290–301. [In Russian.]

(599d) Leech infestation of the nasal cavities considerably affected geese in the forest-steppe zone of Altai, causing losses of 10% to 60% on different bird farms during July–August. From 12 to 52 leeches could be found in a bird. Irrigation of the nasal cavities with 10% saline prevented death in 49 of the 53 geese treated; the birds were kept on dry land during treatment. G.I.P.

600—Sbornik Trudov. Leningradski Nauchno-Issledovatel'ski Veterinarni Institut.

- a. TAKHISTOV, B. A., 1957.—[Treatment of dictyocauliasis in calves by inhalations of iodine vapour.] No. 7, pp. 136–143. [In Russian.]
- b. TAKHISTOV, B. A., 1957.—[Clinical symptoms, pathogenesis and prophylactic measures of dictyocauliasis in cattle.] No. 7, pp. 144–146. [In Russian.]
- c. GOLUBEV, N. F. & PANOVA, L. G., 1957.—[The epizootiology of the more important helminthiasis of sheep in the Leningrad region.] No. 7, pp. 147–157. [In Russian.]
- d. GOLUBEV, N. F. & PANOVA, L. G., 1957.—[The biology of *Dictyocaulus filaria* in sheep under conditions in the Leningrad region.] No. 7, pp. 158–166. [In Russian.]
- e. DANILIN, B. F. & TAKHISTOV, B. A., 1957.—[The more important helminth infections of farm animals in the Kaliningrad region and the treatment of dictyocauliasis in cattle.] No. 7, pp. 167–176. [In Russian.]
- f. DOBIN, M. A., 1957.—[Endocarditis and aseptic parietal verrucose thrombo-endocarditis in horses caused by *Delafondia vulgaris*.] No. 7, pp. 177–181. [In Russian.]
- g. DOBIN, M. A., 1957.—[Some types of helminth infection of the aorta in horses.] No. 7, pp. 182–185. [In Russian.]

(600a) Takhistov describes the treatment of dictyocauliasis in calves by inhalations of iodine vapour. The author concludes that iodine vapour, circulating in the lungs, reaches the *Dictyocaulus viviparus* and induces evacuation of the male worms by coughing, provoked by the operation, while the females proceed through the digestive tract and disintegrate on their way. The larvae are evacuated with the faeces. The best results were obtained with a half litre bottle and 0.05 gm. of iodine. Seven days after inhalation no larvae were found in the faeces. The procedure had no side effects on the animals. N.J.

(600b) Takhistov reports on clinical symptoms, pathogenesis and prophylactic measures of dictyocauliasis in cattle. Morbid changes are most frequently observed in the lungs and bronchi. Bronchial gland secretion increases. The author identifies the disease with fog fever. It can take a chronic character. Intravenous injections of norsulphazol sodium and penicillin had good results in treatment. For prophylaxis it is advised to keep calves separately and to pasture them on uninfected lots in early summer and to change the lots during the second half of the season. N.J.

(600c) Golubev & Panova describe the epizootiological study of the more important helminthiasis of sheep in the Leningrad region, carried out over a number of years. Intermediate hosts of *Fasciola hepatica* were young specimens of *Galba palustris*, *Radix pereger* and *Lymnaea stagnalis*. Chlorten and Preparation 125 are recommended as molluscicides in 1 : 1,000 concentration. The development of *Moniezia expansa* in sheep takes 27 to 29 days. Therefore pre-adult anthelmintic treatment should be carried out 25 to 26 days after sheep have been put out to pasture. The most important molluscs in the development of *Muellerius* were *Succinea pfeifferi*, *S. putris* and *Trichia hispida*. N.J.

(600d) Golubev & Panova describe the biology of *Dictyocaulus filaria* in sheep under normal conditions in the Leningrad region. Experiments were carried out in the laboratory and in the field on: (i) developmental periods of the pre-infective stage of *D. filaria*; (ii) the possibility of survival of the larvae through the winter; (iii) developmental periods of *D. filaria* until sexual maturity and its normal life span in sheep. The authors conclude that development of *D. filaria* up to the infective stage could continue through the whole grazing period and that the shortest time taken by development (five to eight days) was during the July to August period. The periods during which development took place depended, above all, on the temperature and humidity and varied in different years. Up to 25% of the infective larvae preserved their viability after having spent the whole winter under a thick layer of snow, while under these conditions all the larvae at the pre-infective stage died. N.J.

(600e) Danilin & Takhistov discuss the more important helminth infections of farm animals in the Kaliningrad region, and the treatment of dictyocauliasis in cattle. They list 66 species of helminths belonging to 51 genera, 28 families, 11 suborders and three classes. The more important of these parasitic infections are: (i) dictyocauliasis, fascioliasis, moniezirosis and echinococcosis among cattle, sheep and goats; (ii) ascariasis, metastrongyliasis and larval echinococcosis among pigs; (iii) parascariasis and strongylosis among horses; (iv) adult echinococcosis and taeniasis among cats and dogs. The agents of all these diseases were found at all seasons. The most intensive *Dictyocaulus* infections were observed in August, while the heaviest *Fasciola* infections occurred in December. The authors recommend iodine vapour inhalations in the treatment of dictyocauliasis and rotational grazing methods in connection with prophylaxis. N.J.

(600f) Dobin reports on endocarditis and aseptic thrombo-endocarditis in horses caused by *Delafondia vulgaris*. 47 cases of chronic fibrinous endocarditis in horses were observed, caused by the larvae of *D. vulgaris*, the presence of which in the aortic valves was noted. Verrucous formations were observed on the aortic surface, at about the median third of the valves, at their base and seldom on the edge. In some cases the valves were thickened or atrophied. The author remarks that the described forms of endocarditis were observed in connection with the death of horses through sharp intestinal obstruction and acute peritonitis. N.J.

(600g) Dobin gives a detailed report, supplemented with plates, on some types of helminth infection of the aorta in horses. Over 35 cases of aortitis caused by *Delafondia* spp. are reported. In the case of generalized aortitis, the abdominal aorta was diseased. The intima was ulcerated and in the thrombic masses many *Delafondia* larvae were found. The pectoral aorta was diseased to a lesser extent. In the case of localized aortitis the foci of infection were near the aortic arch, in the aortic valves and in the sinuses of Valsalva. In both types of aortitis the diseased portions of the arteries presented irregularly rounded thrombi the size of a pea, the endothelium was absent, and the intima was thickened and extensively covered by fibrinous masses, enclosing neutrophil and eosinophil cells. N.J.

601—Scandinavian Journal of Clinical and Laboratory Investigation.

- a. BRANTE, G. & ERNBERG, T., 1957.—“The in vitro uptake of vitamin B₁₂ by *Diphyllobothrium latum* and its blockage by intrinsic factor.” 9 (3), 313–314.
- b. NYBERG, W. & GRÄSBECK, R., 1957.—“Is vitamin B₁₂ in bound or free form in the tapeworm *Diphyllobothrium latum*?” 9 (4), 383–387.
- c. KAIPIAINEN, W. J. & TÖTTERMAN, G., 1957.—“The effect of intrinsic factor in pernicious tape-worm anemia.” 9 (4), 391–394.

(601a) Brante & Ernberg studied the uptake of Co⁶⁰-labelled vitamin B₁₂ *in vitro* with freshly expelled *Diphyllobothrium latum*. About 85% of the vitamin was taken up in 3½ hours; this was reduced to less than 0.8% when intrinsic factor was added to the medium. W.P.R.

(601b) Nyberg & Gräsbeck found that Co⁶⁰-labelled vitamin B₁₂ in homogenates of *Diphyllbothrium latum* was not dialysable. The complex containing the vitamin was precipitated with ammonium sulphate. Dialysable vitamin B₁₂ was freed by treating the complex with alcohol, proteases and by heating or drying it. W.P.R.

(601c) Kaipainen & Tötterman found that a purified intrinsic factor, low in vitamin B₁₂, improved the reticulocyte count of patients with anaemia caused by *Diphyllbothrium latum*. W.P.R.

602—Socker. Malmö.

- a. MÖLLERSTRÖM, G., 1957.—“Determination of the incidence of beet eelworms in soil samples by growing beets in cardboard cartons.” **13** (3), 31–38.

(602a) A detailed account is given of experiments on growing beet seedlings in soil samples taken from fields, to estimate population levels of beet eelworm for advisory purposes. From these, a method is evolved which is put forward as an alternative to standard sampling and cyst extraction techniques, although no statistical evidence is given to show that the method described is an improvement. It is pointed out, however, that it is labour-saving and cheap to carry out, and that the difficulty of distinguishing between *Heterodera* species where mixed populations occur is eliminated. A.M.S.

603—South African Medical Journal.

- a. GELFAND, M., 1957.—“The parasitic diseases of man in Africa.” **31** (45), 1137–1143.
b. HAMMAN, H. DE V. & JOUBERT, M. J., 1957.—“A review of hydatid disease of the brain.” **31** (46), 1163–1167.

604—Sovetskaya Meditsina.

- a. ZOGRAFSKI, B. & TERZIEV, G., 1957.—[Pleurisy caused by *Distoma* (*Paragonimus*).] **21** (1), 102–106. [In Russian.]
b. RABINOVICH, Y. Y., 1957.—[A rare case of metastatic ascariasis of the heart and of the large vessels.] **21** (1), 117–120. [In Russian.]
c. BLITSHTAIN, I. I. ET AL., 1957.—[The role of *Lambia* and *Hymenolepis nana* in dysentery of young children.] **21** (3), 22–26. [In Russian.]
d. KHAMIDULLIN, R. I., 1957.—[Clinical aspects and treatment of opisthorchiasis.] **21** (3), 110–111. [In Russian.]
e. KRAVETS, N. P. & FEDOROVA, V. I., 1957.—[Intensive invasion by *Taenia solium*.] **21** (3), 130–131. [In Russian.]
f. FLEIS, E. P., 1957.—[A case of spinal echinococcus epiduritis.] **21** (5), 130–132. [In Russian.]
g. PETUKHOV, M. I., 1957.—[Diagnostic value of Casoni's test in hydatid disease.] **21** (9), 63–67. [In Russian.]
h. LIKHACHEV, Y. P., 1957.—[Fatalities due to opisthorchiasis. (Data on the pathology, morphology and pathogenesis of opisthorchiasis).] **21** (9), 118–122. [In Russian.]
i. BAUER, O. E., 1957.—[An outbreak of trichinellosis due to eating brown bear meat.] **21** (11), 133–134. [In Russian.]
j. SPEKTOR, F. A., 1957.—[Ascariasis of the biliary ducts.] **21** (11), 134–135. [In Russian.]

605—Srpski Arhiv za Tselokupno Lekarstvo. Belgrade.

- *a. BRKIĆ, D., POPOVIĆ, S. & BABIĆ, D., 1957.—[Clinical aspects of strongyloidiasis.] **85** (7/8), 836–845. [In Serbian.]

606—Therapie der Gegenwart.

- a. MARTIN, G., 1957.—“Bandwurmabtreibungen in der Sprechstunde. Erfahrungsbericht.” **96** (5), 187–188.

(606a) Martin reports that in the early days of the 1939–45 war intraduodenal application of Carlsbad salt (160 gm. in 170 gm. water) was successful in the treatment of cestode (? *Taenia*) infection in man. When Carlsbad salt was no longer obtainable he used anhydrous sodium sulphate, 80 gm. in 250 gm. water, administered by duodenal sound. In every case this treatment has removed the tapeworm complete with head without harm to the patient. Martin continued to use sodium sulphate even when Carlsbad salt was again available. For women 200 c.c. of the solution is sufficient. A.E.F.

607—Trudi Kaliningradskoi Nauchno-Issledovatel'skoi Veterinarnoi Stantsii.

- a. DANILIN, B. F., 1957.—[Importance of cattle yards in the prevention of fascioliasis.] **1**, 82–84. [In Russian.]
- b. DANILIN, B. F., 1957.—[Experimental use of phenothiazine against strongylate infections in horses.] **1**, 85–88. [In Russian.]
- c. DANILIN, B. F., 1957.—[Phenothiazine for *Heterakis* infestation in fowls.] **1**, 89–92. [In Russian.]

(607a) Danilin has demonstrated on a farm that *Fasciola* infections remained low (1% to 6.4%) in cattle which were kept in stalls or yards on fresh green fodder and with a hygienic water supply, while the rate of infection in control cattle grazed on the usual pastures with access to local canals and ponds rose from 5.82% in the spring to 45% in the autumn.

G.I.P.

(607b) Phenothiazine is advocated against strongylate infections in horses. Five horses ceased to pass eggs in the faeces 35 days after each had received 10–15 gm. of phenothiazine as a single dose in two separate portions of oats followed two weeks later by daily doses of 5 mg. per kg. body-weight for 20 days; while the number of eggs passed by five controls increased in that period.

G.I.P.

608—Trudi Moskovskoi Veterinarnoi Akademii.

- a. ABULADZE, K. I., 1957.—[*Coenurus* as a parasite common to man and animals.] **19** (1), 298–303. [In Russian.]
- b. DEMIDOVA, N. V., 1957.—[Epidemiology of *Bunostomum* infestation in sheep.] **19** (1), 327–338. [In Russian.]
- c. OSIPOV, A. N., 1957.—[The ability of *Heterakis gallinarum* eggs to survive in cold conditions.] **19** (1), 350–355. [In Russian.]

(608a) Abuladze lists the 29 cases of coenuriasis (14 *Coenurus cerebralis*, five *C. serialis* and three *C. glomeratus*) reported from man, giving the author, the description and age of host, the localization and country of occurrence, and maintains that the first record was made by Lindeman in 1867.

G.I.P.

(608b) Demidova, in a discussion of *Bunostomum* infection, reports on the localization of *B. trigonocephalum* which is the main cause of bunostomiasis in sheep in the U.S.S.R. At post-mortem examination of 223 naturally infected sheep and eight experimentally infected lambs numerous cases of hyperparasitism were observed; in these the heads of *Bunostomum* were embedded in the proglottides of *Moniezia*, causing degeneration and dystrophy of the latter. Fourth-stage larvae were found in the lung tissue six to eight and ten days after experimental infection of lambs and fifth-stage larvae in the contents of the abomasum and fixed to the walls of the small intestine after 12 to 17 days. In culture eggs emitted by *B. trigonocephalum* were at various stages of segmentation. At 27°C. larvae were formed within 30 to 40 hours and left the egg-shell after 48 hours; the second moult took place three to four days later and the third (infective) stage was reached within six to seven days. At 25°C. this period was prolonged to 10 to 12 days and at 22°C. to 14 to 16 days. Under natural conditions it was found that the development of eggs depended directly on the surrounding temperature. The infective stage was reached within 9 to 14 days in August and within 56 days in April and May. Development stopped in October with the air temperature of –3°C. Under the climatic conditions of the Moscow region *B. trigonocephalum* larvae did not survive the winter. Under laboratory conditions it was found that infective larvae remained viable for 16 days at 27°C. but after 32 days at 20°C. 90% of them had died and the remaining 10%

had become transparent. At temperatures varying from 15°C. to 18°C. 20% of the larvae remained alive for 43 days; after 48 days no more larvae were found. *Bunostomum* infection was not observed in lambs less than three months old which had been born during the winter and had not grazed. All lambs aged up to one year which had grazed became infected. 100% infection was also observed in sheep over one year old, but the intensity of infection was 44.1 specimens as compared with 112.4 specimens in the case of lambs. The incidence of *Bunostomum* in adult sheep rose and fell twice a year, the first depression occurring in July and August and the second in December, January and February. This is attributed to the reduction in egg output. 100% incidence was observed during the spring and autumn periods. Kids were not very receptive to the infection and, moreover, the infection took place only when the larvae were administered *per os*. 85% to 89% of infective larvae became established in the case of infections via the skin and 12% to 14% in the case of infections *per os*. The author concludes from this that under natural conditions infection is mainly through the skin. N.J.

(608c) *Heterakis gallinarum* eggs when placed in faecal samples in hen houses and poultry yards for the whole winter retained their viability and were capable of further development. Thus from samples overwintering under 1.4 to 1.8 m. of snow, 83.9% to 89.3% of eggs developed to the larval stage in an incubator in spring and 32.0% to 58.5% in the open in June. The larval stage was reached in June also by 45.4% of eggs from samples placed on the ground inside the hen house and by 90.9% to 36.4% of eggs from samples set 5 to 20 cm. into soil. The activity of these larvae was confirmed by infecting chicks. G.I.P.

609—Trudi Novocherkasskogo Zootehnicheskogo-Veterinarnogo Instituta.

- a. KRIVOSHTA, E. E., 1957.—[Experimental treatment of *Dicrocoelium* infection in sheep.] **10**, 329–331. [In Russian.]
- b. LISENKO, A. A., 1957.—[Seasonal dynamics of haemonchiasis in sheep.] **10**, 333–340. [In Russian.]

(609a) Subcutaneous injections of vaccine prepared from *Dicrocoelium* worms and of antireticular cytotoxic serum, and oral administration of an onion preparation, a garlic extract and an infusion from maize stigmata, proved ineffective against *Dicrocoelium* infections in six sheep, as indicated by the numbers of eggs passed in the faeces. G.I.P.

610—Trudi Omskogo Veterinarnogo Instituta.

- a. KADENATSII, A. N., 1957.—[*Setaria marshalli* infection in sheep.] **15**, 137–141. [In Russian.]
- b. KADENATSII, A. N. & GARKAVI, B. L., 1957.—[*Setaria capreola* n.sp. from European roe-deer.] **15**, 237–242. [In Russian.]
- c. KADENATSII, A. N., 1957.—[*Echinostoma citellicola* n.sp. from rodents.] **15**, 243–247. [In Russian.]

(610a) [This is essentially the same as the paper which appeared in *C.R. Acad. Sci. U.R.S.S.*, **107**, 191–192. For abstract see *Helm. Abs.* **25**, No. 215c.]

(610b) *Setaria capreola* n.sp. is figured and described from the abdominal cavity of European roe-deer in the Crimea and the Caucasus. Characteristic features are, in the female, the presence of round lateral appendages on the tail, the tail tip extending into a thickened layer of cuticle with a terminal protruberance, and, in the male, of three pairs of ventral post-anal papillae and of four small lateral pairs which are situated more posteriorly. The smaller of the two spicules is 0.079 mm. long and is slipper-shaped with a bent, gradually narrowing distal end and a wide proximal end, while the larger is 0.256 mm. long and composed of an elongated tubular portion with a funnel-shaped proximal end and a short flattened and ridged distal portion. G.I.P.

(60c) *Echinostoma citellicola* n.sp., described and figured from the small intestine of *Peromyscus* from the Crimea and the Azov area, differs from the previously described species of *Echinostoma* from mammals by the smaller number of spines on the adoral disc (29 as opposed to 35 and more) and the position of the vitellaria which start at the level of the anterior edge of the anterior testis and unite behind the testes. G.I.P.

611—Verslagen en Mededelingen van de Plantenziektenkundige Dienst te Wageningen.

- a. KORT, J., 1957.—“Het voorkomen van het haver cystenaaltje (*Heterodera avenae* Filipjev 1934 = *H. major* Schmidt 1930) in Nederland.” No. 130, pp. 143-146. [English summary p. 146.]

(611a) From a survey carried out in 1956 and 1957 throughout the cereal growing areas of the Netherlands, oat eelworm was found in 60.6% of the soil samples, 36% containing less than 10 cysts and 24.6% more than 10 cysts per 200 c.c. soil. The occurrence of oat eelworm was greatest in the sandy districts and was correlated with the intensity of cereal cultivation. It is suggested that soil sampling would be useful to farmers before working out crop rotations, and control of wild grasses is advised. A.M.S.

612—Věstník Československé Zoologické Společnosti.

- a. PROKOPIČ, J., 1957.—“Helminthofaunistický výzkum rejsců z rodu *Neomys*.” 21 (1), 44-64. [German & Russian summaries pp. 59-61.]
 b. PROKOPIČ, J., 1957.—“Výsledky helmintologického výzkumu našich ježků.” 21 (2), 97-111. [English & Russian summaries pp. 109-111.]
 c. CHYSKÝ, V., 1957.—“Nálezy exotických cizopasníků u opic z pražské zoo.” 21 (2), 139-142. [German summary p. 142.]
 d. ERGENS, R., 1957.—“*Gyrodactylus hraběi* n.sp. s ploutví vranky obecné.” 21 (2), 143-147. [German & Russian summaries pp. 146-147.]
 e. ERHARDOVÁ, B., 1957.—“Plicní červi našich přežvýkavců.” 21 (2), 148-158. [German summary p. 157-158.]

(612a) Prokopič reports the occurrence in the genus *Neomys* (*N. fodiens* and *N. anomalus*) of the following species: *Coronacanthus polyacantha*, *Vampirolepis neomydis*, *V. tridontophora* n.comb., *V. magnirostellata* var. *soltysi*, *Staphylocystis furcata*, *Insectivorolepis globosa*, *I. globosoides*, the larval stage of *Dilepis undula*, *Heligmonella jugatipiculum*, *Tricholinstowia linstowi*, *Angiostrongylus soricis*, *Capillaria kutori*, *C. petrovi*, larvae of *Porrocaecum* sp., and *Polymorphus minutus*. He describes four new species. *Opisthioglyphe anomali* n.sp. from the stomach and small intestine of *N. anomalus*; the differences of this species from other described species of the genus are not given. From the small intestine of *N. fodiens* he describes *Lecithodendrium antetestes* n.sp. which differs from *L. granulosum* in that the testes in the new species are anterior to the ventral sucker, *Coronacanthus spasskii* n.sp., which is distinguished by the size and number of hooks, and *Vampirolepis sumavensis* n.sp. which differs from other species in this genus either in the form or number of hooks, and in the length of the strobila. C.R.

(612b) Prokopič examined 89 specimens of *Erinaceus europaeus europaeus* and 37 specimens of *E. e. roumanicus*, from which he recovered the following helminths: *Rodentolepis erinacei*, *R. steudeneri*, *Mathevotaenia parva*, *Spirura rytipleurites*, *Physaloptera clausa*, *Grenosoma striatum*, *Capillaria erinacei*, *Eucoleus tenuis*, *Prosthorrhynchus formosus* and *Nephridiorhynchus major*. All of these species are redescribed and infection rates are given. The paper is illustrated by nine figures. C.R.

(612c) Chyský, working in the zoological gardens in Prague, found, during post-mortem examination of a specimen of *Lagothrix pöppigi*, encysted larvae of *Porocephalus* in the lungs and *Dipetalonema gracile* in the body-cavity. In another specimen were found *D. gracile*, and in the lungs *Filaroides* sp. In the stomach of *Cebus capucinus* and *C. fatuellus* were found *Physaloptera* sp. The paper is illustrated by a figure and five photographs. C.R.

(612d) Ergens describes *Gyrodactylus hraběi* n.sp. from the fins of *Cottus gobio*. The new species is similar to *G. arcuatus* but differs from it by the size of the chitinous part of the haptor. It is also stated that it differs morphologically from *G. rarus* and *G. curiosus* [but no details are given]. C.R.

(612e) Erhardová lists and briefly describes the following lungworms: (i) *Dictyocaulus filaria* from *Ovis aries* and *O. musimon*; (ii) *Muellerius capillaris* and *D. viviparus* from *O. aries*, *O. musimon*, *Rupicapra rupicapra*, *Capreolus capreolus*, *Dama dama* and *Bos taurus*; (iii) *Protostrongylus rufescens* from *O. aries* and *O. musimon*; (iv) *Cystocaulus ocreatus* from *O. musimon*; (v) *Capreocaulus capreoli* from *O. musimon* and *Capreolus capreolus*; and (vi) *Neostrongylus linearis* and *Muellerius tenuispiculatus* from *R. rupicapra*. N.J.

613—Veterinär-Medizinische Nachrichten. Marburg.

- a. HOLZ, J. & TANDJUNG ADIWINATA, R., 1957.—“Untersuchungen über die Antimosan-Therapie der Stephanofilariose beim Rind.” Year 1957, No. 1, pp. 25–35. [English, French & Spanish summaries Suppl. pp. 4–5, 12–13, 20–21.]

(613a) Holz & Tandjung Adiwinata report on their researches, carried out in Indonesia, on stephanofilariasis in cattle. A study of 50 infected animals has shown that the predilection sites for developmental stages of *Stephanofilaria* are the skin and the lymph nodes of the shoulder joint and inguinal region. Subcutaneous application of Antimosan (3.5 gm. in a 7% isotonic solution repeated twice at weekly intervals) was successful in improving the clinical condition within 14 days and in healing the lesions after four to six weeks in all the 23 animals treated. A.E.F.

614—Veterinaria. Sarajevo.

- a. CARROLL, T. H., 1957.—“Epidemiološko prilaženje ovčjoj parazitologiji.” 6 (4), 519–534.
 b. RUKAVINA, J., DELIĆ, S. & VARENIKA, D., 1957.—“Atipični oblik *Multiceps serialis* Gervais 1847 kod zeca (*Lepus europaeus*, Pall.).” 6 (4), 614–620. [English summary p. 614.]
 c. BOKO, F. & BELJIN, V., 1957.—“Prilog proučavanju razvoja *Echinococcus granulosus*-a kod štenadi.” 6 (4), 621–623. [English summary p. 621.]
 d. GALL, Z., 1957.—“Tri nalaza trihine—kod pasa i kod lisice.” 6 (4), 641–643. [English summary p. 641.]
 e. BOKO, F. & BELJIN, V., 1957.—“Rijedak slučaj echinococcosis cystica multiplex jetre kod krave.” 6 (4), 644–645. [English summary p. 644.]

(614a) This article, dealing with the epizootiology of sheep helminthiasis, is based mainly on Australian conditions. C.R.

(614b) The authors describe a case of an atypical *Coenurus serialis* cyst in a hare. The scoleces were located on the external side of the bladder. C.R.

(614c) The authors infected six puppies with scoleces obtained from hydatid of the human liver. 80,000 scoleces were fed to the dogs and 25% reached maturity. 31 days later the tapeworms had developed two segments (in 60%) and three segments (in 40%); they attained the length of 1.5–2.5 mm. and were 0.5–0.8 mm. wide. C.R.

(614d) Gall found two out of eight dogs and one out of two foxes examined in Sarajevo to be infected with *Trichinella spiralis*. C.R.

(614e) In this note a case of hydatid in a slaughtered cow is described. The liver reached the weight of 42 kg. Two photographs illustrating the liver are included. C.R.

615—Veterinariya.

- a. DIKOV, G. I., 1957.—[*Chabertia* disease of sheep in Kazakhstan.] **34** (6), 20–23. [In Russian.]
- b. SAZANOV, A. M., 1957.—[Epizootiology and control of fascioliasis in ruminants.] **34** (6), 28–30. [In Russian.]
- c. AYUPOV, K. V., 1957.—[An apparatus for administering liquid anthelmintics to sheep and goats.] **34** (6), 36–37. [In Russian.]
- d. KLESOV, M. D., 1957.—[Change of pastures and water supply in the control of fascioliasis of sheep.] **34** (7), 25–29. [In Russian.]
- e. SKRYABIN, K. I., 1957.—[The origin and development of helminthology in Russian agriculture.] **34** (10), 3–5. [In Russian.]
- f. DEMIDOV, N. V., 1957.—[Control of fascioliasis in animals.] **34** (10), 33–38. [In Russian.]
- g. STOROZHEVA, A. M., 1957.—[*Physocephalus* infections in domestic fowl, ducks and geese.] **34** (10), 47–49. [In Russian.]
- h. CHUBABRIYA, I. T., 1957.—[A new anthelmintic.] **34** (12), 70–73. [In Russian.]

(615a) Enzootic outbreaks of *Chabertia* disease in sheep accompanied by persistent diarrhoea were observed in the autumn and the following spring causing losses on several farms in Kazakhstan. The best results from treatment were obtained with phenothiazine at a dose of 0.5 gm. per kg. body-weight repeated on the third day. On the sixth day, autopsy of one out of the seven sheep treated showed that the intensity of infection had been reduced by 73.8%. If the number of worms passed by these seven sheep is taken as 100% then the number of worms passed by seven sheep after a single dose of 1 gm. per kg. body-weight was 30.7% and of untreated controls 5.6%. G.I.P.

(615b) Sazanov attempted to infect seven of the commonest fresh-water molluscs in the Don estuary area with *Fasciola* and succeeded with *Galba truncatula*, with *G. palustris* when three to ten days old and with *Limnaea stagnalis* when three days to one month old, but not with *Radix ovata*, *Planorbis planorbis*, *Viviparus viviparus* and *Succinea pfeifferi*. *G. truncatula* and *G. palustris* were also found naturally infected. Free *Fasciola* eggs and adolestariae did not survive the winter and overwintering of the larvae in molluscs was rare. The infection of sheep began to rise in August to a maximum in February–March. The most suitable treatment was the dosing of sheep twice during their winter stabling, two-and-a-half to three months after its commencement, accompanied by prophylactic measures during the summer pasturing period. G.I.P.

(615c) For the intubation of liquid anthelmintics a 260 mm. long chromium-plated metal tube, 4–5 mm. in diameter and bulbous at both ends, is attached to the syringe or funnel. The tube has two bends, a 90–95° bend 70 mm. from the free end and a 120–125° bend in the opposite direction 20 mm. from the other end. A handle with a flat area for the thumb is fitted on to the tube between the two bends. The tube may be also made of ebonite, rubber or fireproof unbreakable glass. The assistant takes the sheep between his feet, holds the head with the left hand and with his right introduces the free end of the tube into the toothless area of the closed mouth in the direction of the base of the tongue. On injection of the anthelmintic by the veterinarian the sheep swallows normally and none of the substance is wasted. G.I.P.

(615g) Out of 929 birds examined in parts of White Russia 97.2% of domestic fowls, 25.2% of ducks and 5.5% of geese were infected with larval spirurids. To determine the identity of the larvae, experimental infection of four rabbits, four chicks and two puppies was undertaken. The larvae developed into adults of *Physocephalus sexalatus* in the rabbits and became established, but only as larvae, in the chicks, while the puppies did not become infected. G.I.P.

(615h) Tin arsenate, in tablets or gelatin capsules, has been tested with good results against *Moniezia* and *Thysaniezia* infections in lambs and *Ascaridia* and cestode infections in domestic fowls. It is also effective against *Moniezia* and *Bunostomum* in calves and *Drepanidotaenia* in geese. It acts both on the larval and on the adult stages, but good results depend on the strict adherence to a 16 to 18-hour starvation diet before treatment. Doses of

0.3–0.4 gm. were 100%, efficient against *Moniezia* in lambs, aged one to five months. The animals received no water on the day of treatment. Even five consecutive doses with intervals of 10, 15, 25 and 30 days were harmless. The lethal dose was 3 gm. for lambs aged three to six months. Doses of 0.7–1.0 gm. were up to 92%, efficient against *Thysoniezia* in one-year-old sheep. All of 175 fowls were cured of *Ascaridia* and cestodes by doses of 0.05 gm. for chicks aged three to four months, 0.07 gm. for those aged five to six months and 0.15 gm. for older fowls. Doses up to 1 gm. were non-toxic. Recently this anthelmintic has been successfully used for the treatment of many thousands of animals in the Georgian S.S.R. Due to its arsenic content, it favourably affects the appetite, growth and skin condition of the animals. The meat of treated animals is harmless to man.

G.I.P.

616—Wiadomości Parazytologiczne. Warsaw.

- a. BOROWSKA-KUŹMICKA, J., DZIĘCIOŁOWSKI, Z., ALEJSKI, A. & KUŹMICKI, R., 1957.—“Paragonimioza płuc i próby jej leczenia wlewkami doodbytniczymi z alkoholu etylowego.” 3 (6), 555–563. [English & Russian summaries pp. 562–563.]
- b. ZEMBRZUSKI, K., 1957.—“Masowe badania parazytofauny przewodu pokarmowego człowieka w Polsce rok 1955.” 3 (6), 575–586. [English & Russian summaries p. 586.]
- c. ULEWICZ, K., 1957.—“Badania nad nosicielstwem pasożytów jelitowych u dorosłych i dzieci przedszkolnych.” 3 (6), 587–592. [English & Russian summaries pp. 591–592.]
- d. KURZEJA, K. & OLEŚ, A., 1957.—“Nosicielstwo pałeczek duru brzuszego a inwazje pasożytnicze.” 3 (6), 593–595. [English & Russian summaries p. 595.]
- e. TARCZYŃSKI, S., 1957.—“Wędrujące larwy pasożytów jako przyczyna niespecyficznych stanów chorobowych u ludzi.” 3 (6), 597–602. [English & Russian summaries pp. 601–602.]

(616a) Two Koreans with *Paragonimus westermani* infections of the lung were treated, after one or several ineffective emetine courses, with 200 ml. of 7.5% ethyl alcohol in physiological saline injected twice daily into the rectum by Grott's method. In one patient the intubations were continued for 20 days, in the second a ten-day treatment was followed by a single intratracheal injection of 3 ml. of a 1% emetine solution. The treatment must be accompanied by antibiotics. A primary increase in the elimination of bloody sputum but without parasitic eggs, was followed by a decrease in sputum, no longer bloody, and containing a small number of egg capsules. The patients stood the treatment well and their general health improved. It is suggested that longer periods of treatment, e.g. 50 days, or repeated cycles might even be used.

G.I.P.

(616b) Out of 40,678 persons examined for helminths in Poland, 0.3% were infected with cestodes (*Taenia solium*, *T. saginata* and *Hymenolepis nana*), 5.4% with *Ascaris lumbricoides*, 10.1% with *Trichuris trichiura* and 16.5% with *Enterobius vermicularis*. The infections have been evaluated separately for different age groups and for 13 counties and the towns Warsaw and Łódź.

G.I.P.

(616c) In Poland, about half of the 351 children and personnel from nursery schools examined and 1,509 adults working with food, were infected with intestinal parasites including the helminths *Enterobius vermicularis*, *Trichuris trichiura*, *Ascaris lumbricoides* and *Taenia solium* (in four adults).

G.I.P.

(616d) Faecal examinations of 122 typhoid carriers and 2,293 non-typhoid controls showed that the incidences of parasites were similar in both groups of people. *Ascaris lumbricoides* (and *Entamoeba coli*) did not appear to influence the development of the typhoid rods.

G.I.P.

(616e) Tarczyński discusses larva migrans and the implicated nematodes, particularly *Ascaris lumbricoides* and *Toxocara* sp., as the cause of non-specific diseases in man.

G.I.P.

617—Zeitschrift für die Gesamte Innere Medizin und ihre Grenzgebiete.

- a. SCHMUTZLER, R., 1957.—“Probleme der Oxyuriasis.” **12** (16), 726–733.
 b. SCHMUTZLER, R., 1957.—“Peritonealgranulome durch Oxyurenie.” **12** (17), 804–808.

(617a) The case recorded in the following abstract gives Schmutzler occasion to review earlier work on the biology, pathology and clinical aspects of *Enterobius* infection, with 121 references to the literature. He concludes that there are two ways in which *Enterobius* could penetrate to the peritoneum: (i) migration from the intestinal wall, and (ii) migration of female worms through the genital tract to the peritoneum of the free body-cavity. A.E.F.

(617b) Schmutzler gives details of a case of enterobiasis in a 32-year-old woman in which granulomata containing *Enterobius* ova were found in the peritoneum during appendectomy. A.E.F.

618—Zoologische Jahrbücher. Abteilung für Systematik, Ökologie und Geographie der Tiere.

- a. HARTWICH, G., 1957.—“Zur Systematik der Nematoden Superfamilie Ascaridoidea.” **85**, 211–252.

(618a) Hartwich proposes a new classification of the nematode superfamily Ascaridoidea basing it largely on his previously published studies on the comparative anatomy of the group (Hartwich, 1954, *Wiss. Z. Univ. Halle-Wittenberg*, **3**, 1171–1212). The superfamily is divided into three family-groups, seven families and thirty-six genera, thus: (a) Ascaridines: (i) Ascarididae, (i) Ascaridinae—*Ascaris*, *Lagochilascaris*, *Parascaris*, *Toxascaris*; (ii) Ophidascariidae—*Ophidascaris*, *Hexametra*, *Polydelphis*; (iii) Angusticaecinae—*Angusticaecum*, *Amphicaecum*. (2) Toxocaridae—*Toxocara*, *Dujardinascaris*, *Neoascaris*, *Paradujardinia*, *Porrocaecum*. (3) Multicaecidae—*Multicaecum*. (4) Acanthocheilidae—*Acanthocheilus*, *Eustoma*. (b) Stomachines: (i) Stomachidae, (i) Stomachinae—*Stomachus*, *Contracaecum*, *Phocascaris*, *Sulcascaris* n.g. with *S. sulcata* (Rudolphi, 1819) as type and only species, *Terranova*, (?) *Cloeoascaris*; (ii) *Raphidascaroides*, *Thynnascaris*. (2) Goeziidae—*Goezia*. Uncertain subfamily: *Amphicaecum*, *Ichthyianisakis*, *Paraheterotyphlum*, *Pseudoterranova*. (c) Crossophorines: (i) Crossophoridae—*Crossophorus*, *Dartevellania*. The systematic position of the genera *Belanisakis*, *Neogoezia*, *Metascaris* and *Paracanthocheilus* is considered uncertain. *Acanthocheilus quadridentatus* Molin, 1858 is considered a synonym of *Ascaris rotundata* Rudolphi, 1819. All the systematic groups are diagnosed and keys to them provided. The nominal species referable to each genus are listed. W.G.I.

NON-PERIODICAL LITERATURE

- 619—ANON., 1957.—“The soybean cyst nematode: a new pest.” Washington, D.C.: U.S. Department of Agriculture, Agricultural Research Service, PA-333, 4 pp.

This is a four-page illustrated pamphlet giving a description and details of the soya bean cyst nematode (*Heterodera glycines* Ichinohe) and its life-history. The pamphlet includes paragraphs on control of the nematode. J.J.H.

620—GOLVAN, Y. J., 1957.—“Acanthocephala des poissons.” Résultats Scientifiques. Exploration Hydrobiologique des Lacs Kivu, Édouard et Albert (1952–1954). Brussels, 3 (2), 55–64.

A hundred juveniles or immature adult acanthocephalans collected from the fishes *Alestes dentex*, *Hydrocyon forskali*, *Lates albertianus*, *Bagrus bayad* and *Schilbe mystus* in Lake Albert, belonged to a single species named *Paragorgorhynchus albertianus* n.g., n.sp. The characteristics of this new genus of Gorgorhynchidae are: a long cylindrical proboscis bearing many rows of numerous hooks, without dorso-ventral dissymmetry, lemnisci much shorter than the receptacle and four very short cement glands. A key is given for the ten genera of Gorgorhynchidae. *Acanthogyrus tilapiae*, previously recorded by Baylis from Lake Nyassa, is now reported from Lake Albert in the fishes *Tilapia galilaea*, *T. leucosticta* and *T. nilotica*.

R.T.L.

621—HORTON-SMITH, C. [Editor], 1957.—“Biological aspects of the transmission of disease.” Edinburgh: Oliver & Boyd, viii+184 pp.

- a. TAYLOR, E. L., 1957.—“The transmission of helminths of veterinary importance.” pp. 43–49. [Discussion pp. 157–159.]
- b. STANDEN, O. D., 1957.—“The transmission of schistosomiasis.” pp. 107–112.
- c. BERTRAM, D. S., 1957.—“The transmission of experimental filariasis.” pp. 113–122. [Discussion pp. 169–171.]
- d. KERSHAW, W. E., 1957.—“The population dynamics of the filariae of man with particular reference to *Loa loa* and *Onchocerca volvulus*.” pp. 141–145.

(621a) Taylor discusses some of the complexities of adaptations of host to parasite and parasite to host with particular reference to non-biological agencies. Special attention is given to development of helminths outside their hosts, to the resting stages, and to the effect of environmental factors thereon. Statistical evidence is adduced to illustrate the elasticity of the host-parasite relationship. All the examples cited are of veterinary importance. J.M.W.

(621b) Standen reviews the life-cycle and transmission of the three chief schistosome species affecting man and stresses the lack of information concerning the ecology and taxonomy of the molluscan vectors. J.M.W.

(621c) The size and accessibility of *Litomosoides carinii* in the cotton-rat should be favourable to numerical studies on transmission, but neither of the methods available for transmission in the laboratory is quantitatively reliable. Nevertheless it has been possible to investigate some patterns of infection. After a single exposure to infection, the microfilarial density in the blood of the cotton-rat is higher when more adult worms are present, up to 15–20 worms of each sex, but with greater numbers the worms are stunted and the microfilarial density is no higher. After short periods of exposure to infection at intervals of several weeks or months, large numbers of adult worms are found, some of which are in the peritoneal cavity in addition to those in the pleural cavities, and the microfilarial density is high. Such rats are good infectors although not necessarily better than rats with far fewer microfilariae. After continuous exposure to infection for up to six months, stunted adult worms are found, the microfilarial density is low, and the microfilariae appear in the blood for only a short time. In nature this might result in a temporary reduction in the transmission rate which would direct the degree of infection back to conditions where the rats were exposed to infection for short periods and became good infectors. Further understanding of the significance of different amounts of reinfection will depend on accurate control of the numbers of worms transmitted. The results from cotton-rat filariasis show that the numbers of adult worms, their sites of development, the frequency of reinfection and the pathogenic effects on the rats are important biological variables affecting the course of the infection and the transmission of the parasite. In discussion of this paper, the development of immunity to filarial infection by the mammalian host, the resistance of cotton-rats to the mite intermediate host and the effect of the parasite on the mite were mentioned. W.A.F.W.

(621d) Kershaw believes that it is important to assess the effect of differing environmental conditions on the host-parasite-vector complex and that this can be done by estimating various parameters of the populations. Parameters of the uptake by the vector of microfilariae of *Loa* and the survival of larval *Loa* to the infective stage in the vector, and of the uptake of microfilariae of *Onchocerca volvulus* from human cases of different intensities, are described.

W.A.F.W.

- 622—KURASHVILI, B. E., 1957.—[The helminths of game birds in Georgia, their systematics and ecology.] Moscow: Izdatelstvo Akademii Nauk SSSR, 434 pp. [In Russian.]

The 222 helminth species found, mainly by the author, in 2,700 game birds (belonging to 120 species) in various parts of the Georgian S.S.R. are monographed. Thirty new host records are made and 11 species are reported for the first time from the U.S.S.R. The helminths are listed under hosts. 63% of the birds were infected with nematodes (of 82 species), 55.9% with trematodes (66 species), 47% with cestodes (60 species) and 19% with acanthocephalans (14 species). In the ecological section, infections of birds in relation to their distribution in the different geographical zones of Georgia and the dependence of the helminth fauna on the mode of life, food and age of the birds and on seasonal dynamics are discussed.

G.I.P.

- 623—LANIER, T. J., 1957.—“Burrowing nematode survey in Arizona, January 14–February 28, 1957.” Washington, D.C.: U.S. Agricultural Research Service, Plant Pest Control Division, 8 pp.

A survey of citrus growing areas of Arizona revealed only one infestation by the burrowing nematode *Radopholus similis* (Cobb) Thorne. Details of the sampling techniques are given, as well as a list of plant-parasitic nematodes found during the survey.

J.J.H.

- 624—MANSON-BAHR, P. H., 1957.—“Synopsis of tropical medicine.” London: Cassell & Co. Ltd., 3rd edit., xiii + 287 pp.

625—PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON SCIENTIFIC ASPECTS OF MUSHROOM GROWING (3rd), Paris, June 14–20, 1956.

- a. RITTER, M., 1957.—“Les nématodes et la culture du champignon de couche.” pp. 90–99. [English & German summaries pp. 97–99.]
- b. MORETON, B. D. & JOHN, M. E., 1957.—“A note on *Aphelenchoides* eelworms as mushroom pests.” pp. 99–101. [French & German summaries p. 101.]

(625a) Ritter briefly outlines the species of nematodes noxious to mushrooms as *Rhabditis*, *Dirtylenchus destructor* and *Aphelenchoides* sp. and their effects on the mycelium. He states that infestation can arise from the compost, casing soil, cellar earth or by accidental conveyance. Prevention is by controlled heating, disinfection by formol or by a nematicide.

J.B.G.

(625b) The authors describe experiments showing that *Aphelenchoides* [*composticola* Franklin, 1957] destroys mushroom mycelium. Boxes and bed boards can be cleaned by treatment with boiling water or cresylic acid.

J.B.G.

- 626—SKRYABIN, K. I., 1957.—[Trematodes of animals and man. Principles of trematodology. Volume XIII.] Moscow: Izdatelstvo Akademii Nauk SSSR, 783 pp. [In Russian.]

This volume, dealing principally with trematodes of fresh-water and marine fishes, contains revisions of (i) Zoogonoidea by Skryabin, (ii) Fellodistomatidae by Skryabin & Koval, (iii) Ochetosomatidae (Plagiorchioidea) by Skryabin & Antipin and (iv) Hirudinellidae, Ptychogonimidae, Sclerodistomatidae and Syncoeliidae (Hemiurata) by Skryabin & Gushanskaya. (i) Skryabin erects Zoogonoidea n. superf. for Zoogonidae and Steganodermatidae: he makes *Paralepidophyllum* a synonym of *Steganoderma*, its only species becoming *S. pyriforme* n. comb. *S. paraxocoeti*, *S. hemiramphi*, *S. elongatum*, *S. spondyliosomae* and *S. nitens*, which differ from the genotype *S. formosum*, are transferred to *Manteroderma* n.g. The chief differential characters of this genus are a spined cuticle, the lateral genital pore, the

testes which are symmetrically spaced along two lateral lines, and the intestinal caeca which reach beyond the testes. *Pseudozoogonoides* Zhukov, 1953 [1957], which was made for *Diptherostomum microacetabulum*, is rejected. (ii) In the Fellodistomatidae, a detailed analysis of its genera led to the erection of eight new subfamilies in addition to the three existing ones, namely, Ancylocoeliinae (for *Ancylocoelium*), Antorchinae (for *Antorchis*, *Orientophorus*, *Parantorchis* and *Pseudodiscogasteroides*), Lissolomatinae (for *Lissoloma* and *Lomasoma*), Proctoecinae for (*Proctoeces*, *Mesolecitha*, *Symmetrovvesicula*, *Urorchis* and *Gauhatiiana*), Pyriforminae (for *Pyriforma*), Tergestinae (for *Tergestia*), Yamagutiinae (for *Yamagutia*) and Markevitschiellinae; the last-named subfamily contains *Markevitschiella* n.g. made for *Steringotrema nakazawai* on the grounds that the ventral sucker is exceptionally large and the uterus lies on the left side of the body. Within the Fellodistomatinae, *S. pulchrum* Johnston, 1913 is transferred to *Lintonium* and the specimens described by Layman in 1930 under *S. pulchrum* to *L. laymani* nom. nov. *Rhodotrema quadrilobata* remains an independent species. *Ovotrema* with its single species *O. ponticum* was made a synonym of *Bacciger bacciger* in a dissertation by Koval in 1954. (iii) In the Ochetosomatidae, Skryabin & Antipin agree with Kagan (1947) that *Neorenifer* is a synonym of *Renifer*; this had, however, been made a synonym of *Ochetosoma* by Leão (1945). All the species originally in these three genera are now placed in *Ochetosoma*. (iv) The Hirudinellidae include *Uroproctinella* Skryabin & Gushanskaya, 1956 [which was mentioned but not described in *Trudi Gel'mintologicheskoi Laboratorii, Akademiya Nauk SSSR*, 1956, 8, p. 154]; the genus is erected for *U. spinulosa* n. comb. and is characterized by a spined cuticle, the genital pore opening below the intestinal bifurcation and the gut caeca uniting posteriorly to form a uroproct. Skryabin & Gushanskaya disagree with Yamaguti (1953) who made *Capiatestes* a synonym of *Syncoelium* and regard it as an independent genus of Syncoeliinae. Four families of Hemiurata which have already been revised in Volume IX, X and XI are now brought up to date with regard to recently described genera and species. G.I.P.

627—SKRYABIN, K. I., SHIKHOBALOVA, N. P. & ORLOV, I. V., 1957.—[Principles of nematology, edited by K. I. Skryabin. Vol. VI. Trichocephalidae and Capillariidae of animals and man and the diseases caused by them.] Moscow: Izdatel'stvo Akademii Nauk SSSR, 587 pp. [In Russian.]

In this illustrated monograph, Skryabin, Shikhobalova & Orlov give a detailed account of the characters of Trichocephalidae [using *Trichocephalus* in preference to *Trichuris*] and Capillariidae and bring the classification by Skryabin & Shikhobalova, 1954 [for abstract see *Helm. Abs.*, 23, No. 996] up to date. The Capillariidae now contain *Capillaria*, *Eucoleus*, *Skrjabinocapillaria*, *Hepaticola* and *Thominx*. *C. obsignata* takes the place of *C. columbae* as type of *Capillaria*, as the latter is a synonym partly of *C. obsignata* and partly of *C. caudinflata*. *Thominx wavilovoi* nom. nov. is erected for specimens of *C. longicollis* with a spined spicule sheath (as understood by Madsen, 1945 who transferred *C. caudinflata* of Wavilova, 1926 to *C. longicollis*), those with a smooth sheath being synonymous with *C. caudinflata*. *C. rubra* is transferred to *Eustrongylides* in the Dioctophymata. Although Skryabin & Shikhobalova had made *Hepaticola* a synonym of *Thominx*, Skryabin, Shikhobalova & Orlov now agree with Pavlov (dissertation, 1955) that it is an independent genus and also include in it *H. fagei*, *H. tritonis-cristati* (both originally in *Capillaria*) and *Hepaticola* sp. Yamaguti, 1935. The authors distinguish six types of ontogenetic development in the Trichocephalata, (i) trichocephalid, a simple life-cycle alternating between one host and the external medium; (ii) thominxid, requiring one intermediary; (iii) trichothominxid, where development may be simple or via a reservoir host (e.g. *C. putorii*); (iv) trichosomoidid, a simple cycle but the larvae become fully developed in the eggs within the female; (v) hepaticolid, eggs are only freed from the host if it dies and disintegrates or is eaten; and (vi) trichinellid, the larvae derived from the adult parasites settle in the muscles within the same host. The biology, control and various aspects of infection are discussed by Shikhobalova for *Trichocephalus trichiurus* in man and briefly for trichocephalids in animals, and by Orlov for capillariids in man and animals. G.I.P.

628—SYMPOSIUM ON HOST SPECIFICITY AMONG PARASITES OF VERTEBRATES (1st), University of Neuchâtel, April 15-18, 1957. Neuchâtel: University of Neuchâtel, 324 pp.

- a. MAYR, E., 1957.—"Evolutionary aspects of host specificity among parasites of vertebrates." pp. 7-14.
- b. MANTER, H. W., 1957.—"Host specificity and other host relationships among the digenetic trematodes of marine fishes." pp. 185-196. [Discussion pp. 197-198.]
- c. LLEWELLYN, J., 1957.—"Host-specificity in monogenetic trematodes." pp. 199-211. [Discussion pp. 211-212.]
- d. DUBOIS, G., 1957.—"La spécificité de fait chez les Strigeida (Trematoda)." pp. 213-227. [Discussion p. 227.]
- e. DOLLFUS, R. P. & NOUVEL, J., 1957.—"Une énigme pour la spécificité parasitaire et la biogéographie: le cas d'*Achillurbaenia* (Trematoda Digena)." pp. 228-229. [Discussion p. 229.]
- f. CHABAUD, A. G., 1957.—"Spécificité parasitaire chez les nématodes parasites de vertébrés." pp. 230-242. [Discussion pp. 242-243.]
- g. GOLVAN, Y. J., 1957.—"La spécificité parasitaire chez les acanthocéphales." pp. 244-254.
- h. DOLLFUS, R. P., 1957.—"Que savons-nous sur la spécificité parasitaire des cestodes tétrarhynques?" pp. 255-258. [Discussion p. 258.]
- i. EUZET, L., 1957.—"Cestodes de sélaciens." pp. 259-269. [Discussion p. 269.]
- j. BAER, J. G., 1957.—"Répartition et endémicité des cestodes chez les reptiles, oiseaux et mammifères." pp. 270-291. [Discussion pp. 291-292.]
- k. KENT, H. N., 1957.—"Aspect biochimique de la spécificité chez les cestodes." pp. 293-307. [Discussion pp. 307-308.]
- l. ROGERS, W. P., 1957.—"An alternative approach to the study of host-parasite specificity." pp. 309-310. [Discussion pp. 310-311.]
- m. ANON., 1957.—"How to collect parasites." pp. 318-324.

(628a) In this first paper Mayr points out that if the evolution of a parasite is retarded compared to that of the host, as is true in some cases, then the parasite will show phylogenetic relationships which have become obscured in the vertebrate host. But sound systematics and reliable host records are essential. He lists as the first important questions "Where does host specificity occur?—How strict is it?—What groups of parasites are most host specific?—Why are some parasites highly specific, others of rather wide distribution?" and goes on to discuss the answers, largely of the example type, which are to be found in the literature. Amongst other questions asked and topics discussed are: why are cestodes more host specific than acanthocephalans, where and under what circumstances does host specificity break down, the effect of ecology, secondary transfers, dispersal, multiple invasions and competition and general adaptive aspects of parasitism. Numerous helminthic examples are cited. s.w.

(628b) Manter, in his introduction, points out that few collectors of Digenea from marine fish record the presence or absence of other species within a single individual host. He then considers, quoting numerous examples from his own and other workers' observations, convergent evolution amongst the Digenea and the taxonomic value of various morphological characters. Collection records indicate that there is considerable specificity between marine fish and their Digenea although this is not as great as in the Monogenea. A table illustrates this by giving records of the number of species occurring in one to four or more hosts in Japan, Tortugas, the Mediterranean and the British Isles. Other aspects with which Manter deals are: speciation and evolution amongst Digenea of fish, including fresh-water, with particular reference to the work of Szidat on the Digenea of fresh-water fish in Argentina, the parasites of Mugilidae (especially the Haplosporididae and the Haploporidae) and the Digenea of plectognath fish (especially the Opistholebitidae and the Accacoeliidae). In conclusion he points out that the status of each parasite must be appraised on its own merits and that a knowledge of the life-histories will greatly clarify the picture, and appeals for fuller information on hosts, and on other parasites present, to be included in all records. s.w.

(628c) Llewellyn presents a very comprehensive review of previous work on the phylogeny and classification of the Monogenea together with a detailed account of his own highly significant observations. He deals firstly with their adaptations including, in some cases, the development of extreme asymmetry, and their dispersal. Under the heading "Speciation" he considers the host or host group and the ecological niches as isolating factors. A histogram

illustrates the distribution of monogenean families among families of fish hosts. In the section on phylogeny he suggests a tentative classification using that of the oncomiracidia, based mainly on the complement of larval hooks and the occurrence and structure of the eyes, combined with that based on the host specificity of the adults. Six main differences between this and previous classifications become apparent. These are: (i) Dactylogyridae and Calceostomatidae are transferred from the Gyrodactyloidea to the Capsaloidea; (ii) Protogyrodactylidae is transferred from Gyrodactyloidea to a new group, the Protogyrodactyloidea; (iii) Fuhrmann's Monopisthodiscinea is re-established in a restricted form as Gyrodactyloidea; (iv) Hexabothriidae is transferred from Polystomatoidea to the new group Hexabothrioidea; (v) Udonellidae is transferred from the Capsaloidea to the new group Udonelloidea; (vi) Chimaericolidae is transferred from Dicliphoroidea to the Chimaericoloidea (as proposed, for different reasons, by Brinkmann in 1952). The various groups are discussed. s.w.

(628d) Dubois outlines the evolution of the Strigeida. The "diplostome" form which is probably the most ancient is represented in the reptiles (mainly crocodiles) by the Proterodiplostomatidae; these are characterized by the possession of a paraprostome and the extension of the vitelline follicles in both segments of the body or restricted to the anterior segment. The primitive form is found again, but without the paraprostome, amongst the Diplostomatidae of warm-blooded vertebrates occurring together with the "holostome" form of Strigeidae. The latter are better adapted to fixation on the intestinal mucosa. The Strigeinae and Diplostomatinae are parasites of birds and the Alariinae and Duboisiellinae of mammals. He then discusses many genera and species and their host distribution. *Fibricola lucida* is of considerable interest—morphologically it appears as a perfect intermediate in the line of derivation of the fibricolids from a neodiplostomid source. As far as species specificity is concerned Dubois shows that in spite of the promiscuity of a number of strigeids in the same biotope and their presence in the same fish intermediary, only certain parasites become established in certain definitive hosts. Tables give, for each of seven orders of birds (mostly further subdivided into families), the strigeids occurring in them with the number of host species, number of cases of infection and number of records of development in unusual hosts. Twenty-two instances of this erratic development are discussed. The recorded observations show clearly that there is a real specificity ("une spécificité de fait") amongst the Strigeida and that "normal" and "exceptional" hosts can be distinguished. The natural specificity of the worms is therefore relative and results from their progressive adaptation to their preferred hosts. The Strigeida are associated more intimately with their hosts than are other trematodes because of their mode of nutrition—the extra-intestinal digestion by the tribocytic organ of the mucous membrane—which leads to a strict dependence of the parasite. Their evolution as far as we can conceive, appears to be marked by a general tendency to replace ecological specificity by phylogenetic specificity and it is because of this that we can establish for these helminths a biological classification based on a combination of morphology and host specificity. s.w.

(628e) Dollfus & Nouvel discuss the problem posed by the Achillurbainiidae. The first species of this family, *Achillurbainia nouveli*, was described by Dollfus in 1939 from *Panthera pardus melas* originating from Malaya, the second, *A. recondita*, (which the authors consider synonymous with *A. nouveli*) was described by Travassos in 1942 from *Didelphis marsupialis* in Brazil and the third, *Poecilorchis* [*Poikilorchis*] *congolensis*, by Fain & Vandepitte in 1957 from man in the Belgian Congo. They postulate, there being certain affinities with *Paragonimus*, that a fresh-water crab acts as second intermediary and that this accounts for the presence of *A. nouveli* in this member of the Felidae and a marsupial as both are known to be crab-eating. In the discussion Baer remarks that if the big cats are the normal hosts, the parasite was probably introduced into South America with the jaguar. s.w.

(628f) Chabaud, in his survey of host specificity amongst the Nematoda, points out that it is neither a phylogenetic specificity, as found amongst the Cestoda, nor an ethological specificity, such as occurs in the Trematoda. For the type of specificity exhibited by nematodes he proposes the term "specificity by metabolic affinity" or ecological specificity. This depends more on the degree of seclusion of the host (its isolation from

the environment by autoregulations) than on its zoological nature; it originates as a broad specificity which becomes fixed very rapidly in the course of evolution and the species, adapted by ecological conditions to a certain number of hosts, becomes biologically fixed and cannot adapt itself to new hosts even when these are closely related zoologically to its normal hosts. From the evolutionary standpoint the localization within the host (particularly of the larvae) is also of great significance. The acquisition of intermediate hosts by nematodes is relatively recent and the phenomena of specificity can therefore be more easily followed in the first stages of parasitism; the adaptation accompanying this is increasing seclusion in the larval life. Factors which affect host specificity in the adult stage are also discussed and numerous examples cited. s.w.

(628g) Classically the Acanthocephala are regarded as being non-specific, as much for their intermediate and paratenic hosts as for their definitive hosts. This affirmation rests only on the two examples which come to mind immediately—*Macracanthorhynchus hirudinaceus* of the pig and *Moniliformis moniliformis* of the rat. However, about 600 species have been described but the life-cycles are only known of about ten and consequently our knowledge of the group is insufficient to generalize. Golvan considers, for those species of which part at least of the life-history is known, the specificity for intermediate, paratenic and definitive hosts. For the first intermediary the specificity seems to be extremely variable but in some cases may be very strict. As morphological characters are the only criteria by which species have been separated to date, many so-called species may be complexes—for example *Moniliformis moniliformis* probably comprises at least three species. Specificity for the definitive host is strict in certain cases (*Gigantorhynchus*) but loose in others, but records have not always indicated whether or no the parasites have actually attained sexual maturity in all the hosts in which they have been found. Certain paratenic hosts appear to be indispensable for the completion of the life-cycle. Our knowledge is too imprecise and fragmentary to say that these helminths show no specificity for the hosts they parasitize during their life-cycle. s.w.

(628h) Dollfus briefly recapitulates our present, insufficient, knowledge of the tetrarhynchs and their life-cycles. From the examples which he cites, which are really too few on which to generalize, he concludes that most show a narrow host specificity. The larvae of some species of the Eutetrarhynchidae are restricted to the lamellibranchs on which the batoid selachoids prey and others to the decapods on which the selachoids feed. The adult of *Gilquinia squali* occurs almost exclusively in *Squalus acanthias*; the adult of *Aporhynchus norvegicum* has only one host *Etmopterus spinax*; *Dasyrhynchus talismani* adults are known only from *Galeus glaucus* and the plerocercus only from *Neothunnus albacora*; the plerocerci of *Floriceps saccatus* and *Gymnorhynchus (Molicola) horridus* are almost entirely limited to *Mola mola*; the adult of *Grillotia heptanchi* occurs almost exclusively in the Hexanchidae. In spite of this the tetrarhynchs throw no light on the phylogeny of the selachians which they parasitize. Although in some cases the zoological group to which the host belongs is of great importance, in others it is ecological, ethological physico-chemical and immunological factors which control the compatibility or non-compatibility of host and parasite. s.w.

(628i) Euzet records the results of his own observations on the cestodes of selachians (Euselachii). From an examination of 1,200 (of which 1,100 were from the Mediterranean in the vicinity of Sète) he found 61 different species of tetraphyllids. Amongst these 36 species were found in only one species of selachian, 14 lived in two or more hosts belonging to the same genus, three occurred in different hosts of the same family and eight in individuals belonging to different families. This shows that in most of the tetraphyllids host specificity is phylogenetic: this is particularly true for those parasitizing selachians of the continental shelf but in deep-water forms the specificity appears to be ecological. In addition marked preferences are shown by different species for particular locations in the spiral valve. As in many of the pseudophyllids the specificity appears already to exist in the larval stages. Numerous examples are cited. Euzet proposes a new classification and, considering each parasite in its host, establishes the relationships between the tetraphyllids and the selachians. The rays are a very interesting case—they all have a comparable biology and their food is almost identical. However, in the genus

Raja the species fall into two groups which do not have the same parasites. The probable phylogenetic relationships of the cestodes and the selachians are shown in a diagram and the parasites are listed under their hosts.

S.W.

(628j) After a brief introduction Baer sets out and discusses, under the various orders and groups of reptilian, avian and mammalian hosts, the genera and species of cestodes found in them. He follows this with a detailed discussion of the conclusions which can be drawn from the observed facts. Under "Adaptation" three aspects are dealt with—the occupation by the parasites of distinct niches within the same host, physiological adaptation to the host and parallel or convergent evolution in similar hosts; of the last-mentioned so little is known that it is not possible to be certain of its existence. Following this Baer gives an account of dispersal under three sub-headings, the transfer to new hosts occupying similar or different ecological niches, the role of the intermediate host and the role of paratenic hosts—known to date amongst cestodes only in the life-histories of *Diphyllbothrium* and *Mesocostoides*. Under "Speciation", the host or group of hosts and the ecological niches as isolating mechanisms are discussed; speciation by isolation has been produced at two different levels, the first time in the interior of a group of hosts phylogenetically related and the second time in specialized hosts which have appeared amongst the first group. The last section is devoted to a discussion of phylogeny—the correlation between the evolution of the hosts and their parasites, the indications furnished by cestodes in the establishment of the phylogeny of the hosts and the chronology of the relationship between hosts and cestodes.

S.W.

(628k) Kent describes his work on the biochemistry of six species of cestode, *Moniezia expansa*, *M. benedeni*, *Hymenolepis diminuta*, *Railletina cesticillus*, *Taenia taeniaeformis* and *Dipylidium caninum* and discusses his findings from the point of view of host specificity. It appears logical to consider the host-parasite relationship as no other than an equilibrium between the physiology of the host and that of the parasite. In the cestodes there exist some very peculiar biochemical characteristics, above all in the protein constituents. The proteins are very rarely free, normally existing bound to non-protein substances such as glycogen, cerebro-sides and bile salts. It is probable that these substances are specific, but further work is required. The activities and role of these protein complexes in the physiology of cestodes are being studied and should yield very interesting results. There is some indication that collagens are absent and, as Rogers stated in the discussion, this would be a biochemical character of great importance. The cuticle appears to be the site of important reactions from the point of view of the host-parasite relationship and has a peculiar morphological structure which is illustrated by electron photomicrographs.

S.W.

(628l) In many parasitic life-cycles there are a number of very abrupt changes in development; these often take place shortly after the parasite enters its intermediate or final host. After the parasite has entered the host or into a free-living stage there are often periods during which development does not proceed very rapidly. Rogers suggests that development is governed by endocrines secreted by the parasites and that in free-living stages the endocrine clock goes off regularly, moult following moult, whereas at the infective stage the endocrine clock stops and only starts again when the host provides the stimulus. He discusses the evidence for this theory, based on work carried out by himself and Sommerville on sheep trichostrongyles.

S.W.

(628m) This is an excellent practical guide for collectors in the field and deals with all aspects. After a general introduction there is a section on preserving fluids which emphasizes that arthropods should be fixed in 80% alcohol, never formaldehyde, nematodes in hot 70% alcohol to which glycerin is added when cold, and helminths other than nematodes in 4% formaldehyde. This is followed by a section on ectoparasites of fishes, reptiles, birds and mammals and on collecting from their dwelling places. In the section on endoparasites it is stressed that these should be collected as soon after death of the host as possible and many useful hints are given. Under each group of hosts there is a list of the various niches and of the types of parasite which may be found therein.

S.W.

- 629—TAYLOR, A. L., 1957.—“ A review of the literature pertaining to the soybean cyst nematode.” Washington, D.C.: U.S. Department of Agriculture, Agricultural Research Service, 7 pp.

This review gives details of the history of the soya bean cyst nematode *Heterodera glycines*. The distribution of the eelworm, its life-history, host plants (good and bad) and general biology are mentioned, and control measures involving crop rotation or chemical treatment are discussed.

J.J.H.

- 630—VOLOKH, Y. A., 1957.—[Echinococcosis in man.] Frunze: Akademiya Nauk Kirgizskoi SSR, 259 pp. [In Russian.]

This illustrated book deals with various aspects of human echinococcosis: its distribution; aetiology; symptoms, diagnosis and treatment of hydatid and pulmonary infections; cysts in other organs of the abdominal cavity and those in rare sites; laboratory diagnosis; the disease in children; the pathological anatomy, and the prophylaxis.

G.I.P.

- 631—WRIGHT, C. A., 1957.—“ A guide to molluscan anatomy for parasitologists in Africa.” London: British Museum (Natural History), 20 pp.

Wright describes the general topographical anatomy of three genera of basommatophoran snails which are intermediate hosts of trematodes of economic importance in Africa. The descriptions are intended to enable those who may not be familiar with the anatomy of pulmonate gastropods to carry out dissections for the purpose of making identifications based on internal characters. The genera described are *Lymnaea*, *Bulinus* and *Biomphalaria*.

C.W.

INDEXES

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NOTE

In all indexes the reference is to the serial numbers and not to the pages. Numbers in **bold** type indicate abstracts, and numbers in Roman type refer to title-only entries.

In the Author Index there are no cross-references to show joint authorship, but authors of joint papers are listed individually. Thus, a paper by "Brown, B., Jones, A. & Smith, J." would have three separate entries, "Brown, B.", "Jones, A.", and "Smith, J." but the serial numbers under the subsidiary authors are given in parentheses.

In the Index of Subjects, alphabetization is under the first word (e.g. "*Acer* sp." before "*Acerina* sp."). Under the generic name of a helminth the following order is observed: papers on the genus as such; papers on undefined species; papers on new and defined species, e.g.

Capillaria
 — spp.
 — *aerophila*
 — *amarali* n.sp.

In cross-entries under names of hosts, the specific names of new species of helminths are now included. Hosts are indexed under their scientific names, where given, except domesticated animals (e.g. cat, pig, sheep), crop plants (e.g. oats, rye, tobacco), and where numerous hosts of the same group are listed in the one paper (e.g. amphibians, birds, cereals, legumes, mammals). The use of alternative scientific names for host or parasite is avoided wherever possible but in cases in which nomenclatorial or taxonomic confusion still exists the same organism may appear under more than one name.

Anthelmintics are listed alphabetically under that word, either by their trade name or by the active principle. There are no cross-references between proprietary drugs having the same or similar constituents and no classification of the drugs is attempted. They are also entered under the name of the parasite or disease and under the name of the host. For eelworms parasitic in or on plants they are entered alphabetically under *Nematicides* (*plant eelworm*) and under the name of the eelworm.

With the Indexes to this Volume an additional Index of Taxonomy has been introduced. This includes new names and changes in taxa but does not replace the entries in the Index of Subjects.

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